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22 JANUARY 1987

Europe/Latin America Report

SCIENCE AND TECHNOLOGY

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EUROPE/LATIN AMERICA REPORT

SCIENCE AND TECHNOLOGY

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WEST EUROPE

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/7310

FRENCH ANTENNA EXPERIMENTS ONBOARD MIR

Paris AEROSPATIALE in French Dec 86-Jan 87 p 32

[Text]

Two Aerospatiale experiments have been selected for the next French-Soviet flight on the Russian Mir space station in 1988: ERA, to test the deployment of a large-size lattice structure, and Amadeus, involving a new deployment mechanism.

ERA: *The purpose of this experiment will be to demonstrate proper deployment of a lattice structure under actual conditions of weightlessness; it will serve in the future for a large deployable antenna system and for the structural elements of future space stations. The structure will be attached to the exterior of the Mir station by a French astronaut in the course of extravehicular activity.*

After he has secured an interfacing unit and a monochrome measurement movie-camera on the station's external ramp, the astronaut will emerge with the lattice structure in its initial folded configuration and attach it to the interfacing unit. The structure will then be deployed by remote control to a diameter of 3.8m.

Inside the station, the crew will conduct several experiments to analyze the behavior of the structure and measure the vibration modes with accelerometers.

Aerospatiale is to supply three ERA models: a model for training in a swimming-pool in March 1987, a qualification model in July 1987 and the flight model in January 1988.

The ERA lattice structure is made of carbon-fiber tubes with light-alloy hinges. The fully-deployed diameter will be 3.8m, the folded diameter 0.6m and the length when folded 1m.

AMADEUS: *This new deployment mechanism will be used, among other things, for the future solar arrays. This experiment is to correlate the deployment tests under ideal conditions of weightlessness. It will take place this time from inside the Mir station.*

Amadeus will come in the form of a model consisting of four articulated arms and their hinges. It will be capable of deployment in two or three dimensions.

Measurements of the deployment kinematics will be made during a series of ten tests, each repeated three times, by two miniature infrared cameras which will record coordinates of the model's motions.

Two models — a qualification model and a flight model — are to be delivered in 1987. □

CSO: 3698/186
/9317

EUREKA 'CARMAT 2000' PROJECT

Paris INGENIEURS DE L'AUTOMOBILE in French Sep 86 p 57

[Unsigned article: "The European Project 'Carmat 2000"]

[Excerpts] The Carmat 2000 project, managed by the PSA group, achieved Eureka status and was modified during the London meeting of European ministers on 30 June 1986.

The project's goal is to produce a car built of new materials--composites and metals, for improved performance while controlling the corresponding industrial costs, particularly for bodies.

This very ambitious objective requires concurrent mastery of the interdependent parameters: materials/process, design, fabrication.

The Carmat 2000 project has the following original characteristics:

The procedure will involve a global approach ending up with a complete vehicle, rather than studies of components;

With the PSA group at the helm, the project will federate 14 European industrial partners of six different nationalities, all leaders in their respective specialties. They are: DSM (Netherlands), ICI (United Kingdom), BASF, Bayer, Vegla (FRG), Vetrotex Italia (Italy), Cristaleria Espanola (Spain), and sinor-Solac, Saint-Gobain Vitrages, Vetrotex Saint-Gobain, Fonderies Montupet, CECA/ELF group (France); the Technological Center for Mechanical Industries (CETIM) and the Institute for Transportation and Safety (INRETS) will provide the necessary testing.

This synergy, based on complementary activities, will also allow the large European suppliers involved in the project to acquire world-class advanced technologies.

With a total duration of five years, the project consists of three distinct phases which endow it with the flexibility indispensible for its successful completion:

Phase I, 24 months, feasibility studies and demonstrations of concepts;

Phase II, 24 months, fabrication of parts for the vehicle;

Phase III, 12 months, assembly and production installation of the final vehicle.

The total cost of the Carmat 2000 project is estimated at 420 million francs, with 170 million for the first phase. It will be financed by significant stakes from each associated enterprise, and contributions from the governments concerned, whose amount and method remain to be defined.

At the same time, we have learned that as part of the Eureka program, the company Garrett SA will participate in the research project for the Automobiles Peugeot gas turbine engine, with scientific direction to be provided by the latter.

The objective of the project is the development, by the year 2000, of a 100 hp gas turbine engine for motor vehicles.

Participating in the project are Pechiney, Microturbo, Volvo, and ONERA (National Office for Applied Studies and Research).

11,023
CSO: 3698/137

WEST EUROPE/AUTOMOBILE INDUSTRY

FRG FIRMS IN EUREKA 'CARMAT 2000' PROJECT

Duesseldorf VDI NACHRICHTEN in German 7 Nov 86 p 56

[Text] Duesseldorf, 7 Nov--BASF plans to participate in the Eureka project. Dr Helmut Heel, director of BASF's reaction resins unit, made this announcement at a press conference for European journalists. The French automobile group Peugeot Societe Anonyme (PSA) has initiated the "Carmat 2000" research project as part of the European agreements.

The research project's goal is an automobile that will fulfil the following requirements: increased vehicle life through extensive use of corrosion-resistant materials, reduction of vehicle noise to reduce driver fatigue and environmental noise pollution, simplified model development and greater accomodation of the vehicle owner's wishes and a reduction of production costs on the basis of premanufactured components and automated assembly.

Three German companies (BASF, Bayer, ICI) and one Dutch company (DSM), which will initially test component concepts, design and manufacture with PSA heading the project, will participate; there are additional plans for a feasibility study and the manufacture of a small number of prototypes. The entire project is expected to take 5 years, the funds required are estimated at DM 140 million. The companies involved are looking for a 50-percent subsidy from their national agencies.

BASF expects to develop three components for "Carmat 2000": a vehicle roof with an integral roof liner made from different plastics, a laminate construction engine mount designed as a load-bearing component in the engine compartment, and a multilayer construction hood that includes the fenders, based on SMC [sheet molding compound].

Participation in this international research project is extremely attractive to BASF for a number of reasons: first, it offers the opportunity to demonstrate the practicality of economical plastics construction in new areas of automobile construction. Second, the company expects to gain additional knowledge about the stress limits of the materials used.

9581
CSO: 3698/117

3.5 BILLION FOR 10 YEARS TO DEVELOP SWEDISH BIOTECHNOLOGY

Stocholm BIOTEKNIK & BIOKEMI in Swedish No 4, Nov 86 p 33

[Text] 3.5 billion kronor during the next ten years for biotechnology in Sweden. That is the gist of the national biotechnology program which was submitted to the government.

The idea is that the state should contribute the main part of the funding, but it is expected that industry will also enter into the program.

The national biotechnology program was developed by a committee consisting of representatives for industry, authorities and research societies such as the Research Council, the University and Institute Office and the Committee for Technological Development.

The idea behind the national program is the organization of the resources within Swedish biotechnology into a national strategy in a manner similar to that in which the information technology was organized into a national micro-technology program.

National Organization

Similar national organizations exist in several other countries within the area of biotechnology. The United States, Japan, France, West Germany and England are putting great efforts into developing the knowledge of biotechnology.

Last year a five-year program was started within the European Community for the development of an infrastructure (data bank, cultural collections) and a common research program.

This year in Japan, MITI (expansion unknown) is starting a national 30-billion yen program for protein engineering. To begin with, five Japanese companies are taking part in the program. A similar focusing on protein engineering is also planned in England and in the United States.

"Fresh Funds"

The organizations that are participating in the Swedish National Committee for Biotechnology have maintained, from the beginning, that their own current

resources cannot be used for this kind of program. There must be new, "fresh" funds from the state. It is hoped that industry will join in after the state demonstrates that the interest in biotechnology in Sweden is a serious one.

The Committee emphasized a couple of areas where it felt the Swedish capability to be especially pronounced. Those areas are, for instance, immunology and separation technology. Accordingly, those areas must be strengthened further.

"White spots" are also indicated, areas where Sweden is clearly behind other countries. Such an area is micro-biology.

Half-a-dozen other areas are considered most suitable for investment of the Swedish resources. Those areas are agriculture, forestry, environmental control, health and hospital care as well as equipment.

Lack of Personnel

Furthermore, the Committee feels that research education has to be reinforced. The lack of competent personnel in Sweden causes businesses to look to other countries for their research and development. Pharmacia is starting a gene technology company in the United States, Astra a development company in India, etc.

"India is an interesting country because many of its researcher, trained in the United States, return home to insufficient resources relative to their knowledge. Establishing operations in India can be viewed as an effective aid to a developing country," says Ragnar Ohlson of the Karlshamn Oil Factories, who is also carefully investigating the research possibilities in India. Ragnar Ohlson is chairman of the Committee which submitted the proposal about a Swedish biotechnology program.

"A definite focus on research in Sweden contributes to the knowledge remaining in the country. Researchers go where the resources are," he says.

University Development

The biotechnology program has now been submitted to the government for consideration in the research and industry-political bills in the spring. STU (expansion unknown), in its turn, recently submitted proposals for three-year programs within various areas of technology. Where biotechnology is concerned, it joins with the Committee's suggested program and asks for an increase in funds of 25 million kronor per year.

The support of STU for industrial projects is often channeled through universities and institutes. There are only a few Swedish biotechnical companies that have their own significant basic research and the cooperate with institutional research even where the work is of a developmental nature.

Many ideas for industrial products and biotechnical processes come from the scientific world. STU wants to make use of these but at the same time draw a dividing line between research and development.

Specific Plans

STU's specific plans for biotechnology during the remainder of the 1980's involve focusing on gene technology, the extraction of produced substances, biosensors and protein engineering, to a certain extent also biomass, water utilization, enzyme technology, microbi cultivation, development of cultivation techniques for plant and animal cells as well as molecular growth genetics.

A gene technolgy program has been in effect since 1979/80 with the basic goal of developing Swedish capabilities within molecular bioloby and of producing more educated researchers for the needs of industry. The hope is that new ideas that are good for industry will emerge from this during the next couple of years.

When it comes to purification and recovery of biotechnical substances, there is both research and industrial knowledge in Sweden. The research is done mainly at the universities of Uppsala and Lund. Examples of industries are Phamacia, LKB, Alfa Laval, Kabi-Vitrum, Perstorp and Berol.

The basic program that started in 1985/86 continues and the result will probably be extensive project grants. Down the line, a collective research program may be considered.

12339
CSO:3698/134

AEROSPATIALE OF FRANCE AUTOMATES COMPOSITES PRODUCTION

Paris AEROSPATIALE in French Dec 86-Jan 87 pp 30, 32

[Text] The manufacture of composite parts is losing its artisanal flavor more and more as volume production gradually takes over thanks to automation and computerization. At the Nantes factor, which is part of Aerospatiale's Aircraft Division and which manufactures composite parts for the Airbus, the ATR, the Mirage 2000 and the Atlantique 2, the Composites Unit is taking on a new look. The first stage is the automation of its heating equipment thanks to electronic data processing.

The Composites Unit's automated hearing equipment has been operational for some months. This represents one of the first steps in a vast restructuring plan centered on the computerization of the plant's production resources.

The manufacture of composite materials, one of this facility's specialties, is likely to expand still further soon, and it is significant that the proportion of investments earmarked for composites was 40 percent this year and will reach 50 percent in 1987. To intensify productivity, this specialist unit is being modernized at all levels.

The explanation lies in the nature of the production work being done: Nantes produces the metal-metal bonded skins for Airbus fuselage Section 12, carbon moving services for the A320's wing, carbon-Nomex wheel-well doors and the Kevlar-Nomex radome. For the ATR42, this factory also manufactures the flaps and dump surfaces in carbon and Nomex-core material and the all-carbon ailerons. In the case of the ATR72 now being developed, the complete carbon-fiber-reinforced outboard wing-boxes will be entering production (see 'Aerospatiale' No 33). Other composite items are also manufactured at this plant: the carbon-reinforced vertical stabilizer for the Mirage 2000, outboard wing-boxes for the Breguet Atlantique 2 and certain central wing portions which are metal-metal or metal/core material bonded elements.

Whether made of metal or fiber, the basic elements are always associated to an organic binder, a resin which must undergo a transformation of its molecular chain in order to produce the material.

This transformation occurs as the result of a polymerization process. At Nantes, the latter is produced by a combination of high temperature and pressure in autoclaves.

High quality standards during the transformation of the resins' molecular chain are essential if the material is to possess high strength characteristics. In other words, polymerization is a vital phase in the production of the material.

This led to automating the constant and repetitive operations involved in polymerization, firstly in order to optimize cycle times and to be able to analyze results, and secondly so as to have a record of production items and ensure that the sequence of operations is perfomed as safely and reliably as possible.

Composite parts are polymerized in a stove, or else in an autoclave in which a maximum temperature of 250C and a maximum pressure of 15 bars can be obtained.

The heating equipment consists of two stoves for items not more than 4m in length, two autoclaves for items up to 30m long, and a small autoclave used for producing prototypes and certification specimens. All items placed in the stoves and autoclaves are equipped with temperature and vacuum probes linked to a computer. Although all the heating gear is controlled from the master station, each stove and autoclave is controlled independently.

A multitasking computer functioning as the central processing unit automatically controls the cycles in each stove, records the instructions being executed and stores them on a hard disk. This provides a graphic record of the manufacturing cycle for each part and, on a printer, a record of possible anomalies corrected by the computer.

There is provision in this computerization of manufacture for possible malfunctions and consequent operation in the so-called 'degraded mode'. The operator has three possible configurations available: an all-automatic mode with the cycles implemented by the multitasking computer, a semiautomatic mode driven by a single-task computer in the event of failure of the CPU, and a manual mode.

In the case of the autoclaves, the system is structured in similar fashion to the stove configuration, except that control is effected by a much more powerful single-task computer. It is planned in the near future to have the entire system linked to a CPU capable of controlling the stoves and autoclaves automatically.

Computer control of the autoclaves is in real time. The computer displays all the temperatures sensed inside the parts and controls the temperature in the autoclave accordingly. Thus the temperature, pressure and vacuum are regulated according to the required values and always maintained within upper ans lower polymerization values for the entire duration of the cycles, which varies between six and twelve hours depending on the type of part being manufactured.

This is only a first step in computerizing the Composites Unit at Nantes. For example, the storage and handling of the production tools that converge toward the autoclaves is planned for the near term. A prime candidate for this extended automation will be a stove/autoclave loader equipped with interchangeable pallets on which the tools and the items to be polymerized will be prepared. □

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/9317

JOINT VENTURES: FOKKER STRATEGY INCLUDES MANY PARTNERS

Rotterdam NRC HANDELSBLAD in Dutch 10 Sep 86 supplement p 4

[Article by Pieter Graf: "No One Flies Alone. Swarttouw Swears by Cooperation"; first paragraph is NRC HANDELSBLAD introduction]

[Text] No aircraft manufacturer can make on its own any more. That includes Fokker. That is why the firm is cooperating more and more with other companies. That includes Germans, Italians, British, and Americans. But there has be a limit to the number of cooperative ventures. Because for the present the company has its hands more than full with the Fokker 50 and the Fokker 100. Interview with Frans Swarttouw, a president with problems.

"Future projects will be of such magnitude that it will be impossible for anybody to carry them out alone. Furthermore, cooperation also has the advantage of better market penetration, or to put it another way: it prevents markets from being barred to you."

Fokker President Frans Swarttouw makes it very clear that the successors to the Fokker 50 and the Fokker 100 will be developed in cooperation with other manufacturers to an even greater degree than before. He looked with some disapproval, however, at a journalist who entered the Fokker booth at the Farnborough Air Show with a Boeing button on his lapel with the motto "No one flies alone."

Even so, last week Fokker signed a cooperative agreement with Boeing, West Germany's Messerschmitt-Boelkow-Blohm (MBB), and Indonesia's Industri Pesawat Terbang Nusantara (IPTN, the former Nurtanio). Swarttouw: "That's for a preliminary study for an aircraft with a capacity of 80-100 passengers. Each of the participants has a 25 percent share. Each company will provide a team of 7 to 10 people for the project. They'll look at two areas: the available technologies plus the market aspects and the specifications for the aircraft."

"The first phase of the study will be a global survey. The division of labor will only come up in a later round. For right now, a few million guilders have been allocated to the project. Around the end of this year there'll be an interim evaluation to see how far we'll be going."

Swarttouw is not willing to make any predictions about cooperation in other projects. He points out that at this moment Fokker is participating in the NH-90, a study project being carried out by France, Italy, West Germany, Great Britain, and the Netherlands; this is supposed to lead to the design and construction of a heavy transport helicopter. Two days after our conversation Fokker announced that it had signed an agreement with the British-American company Westland, the Italian manufacturer Agusta, and the Spanish aircraft producer Casa for a joint study of the possibility of a light combat helicopter that would be available in the mid-1990's.

Boeing

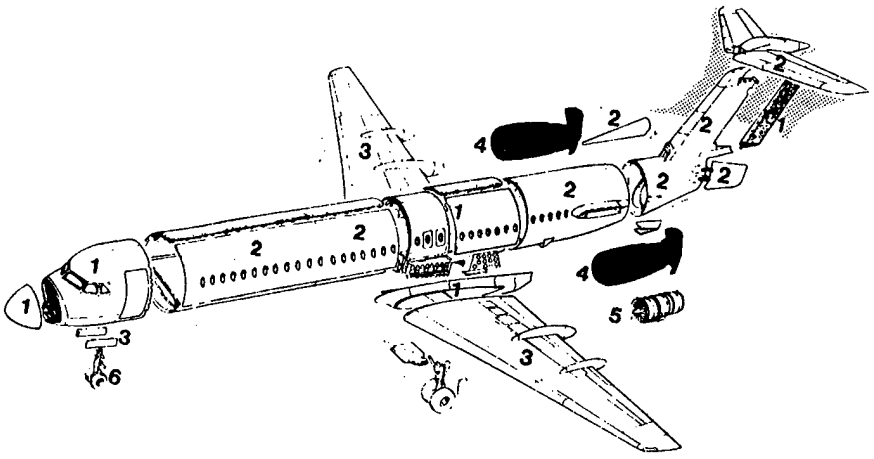
That seems to be everything. "It's too early to participate in any study for a combat aircraft. We're still fully occupied with the construction of the F-16. We can't rule out the possibility of participating in Boeing's 150 seater, although the cards for that 7J7 project have mostly been dealt already."

What Swarttouw means by that is that the subunits that Fokker clearly finds attractive have already been given out. Japan Aircraft Development Corporation, a cooperative venture of Mitsubishi, Kawasaki, and Fuji, has already acquired 25 percent as a full risk-bearing partner. Sweden's Saab Scania and Short Brothers from Belfast have both been named subcontractors, each for 5 percent. Given Boeing's statement that it wants at least 51 percent of the project for itself, there is only 14 percent left. A while ago the Fokker president declared that participating in the 7J7 project as a full-fledged partner would mean sharing the risks, while in fact all Fokker would be is a subcontractor. Not a very attractive prospect, he concluded.

Swarttouw also wants to get the real reasons off his chest: "At this moment we have neither the capacity nor the money." The Fokker 50 and the Fokker 100 projects are straining the firm to the utmost. "An order like the one from Ansett, 22 at once, is unheard-of in this market segment. With the Fokker 50 we're heading for a production rate of two aircraft a month. That's very feasible. With the Fokker 100 we'd like to see orders of 20. Orders of 50 to 100 are more than we want, but we'll have to be prepared for them."

"For the present, we've set the production rate for the Fokker 100 at two a month. That may well change to three or four. Four's the maximum we can achieve without making drastic changes in our infrastructure. In any case, we're not talking about producing 10 aircraft a month."

Who Makes What in the Fokker 100



1. Fokker
2. Messerschmitt-Boelkow-Blohm (risk-bearing partner)
3. Short Brothers (risk-bearing partner)
4. Grumman (engine nacelles)
5. Rolls Royce (engines)
6. Dowty Rotol (landing gear)

Swarttouw says that Fokker certainly can achieve a production rate of four Fokker 100s a month, because that would not require large-scale hiring. "Also, you can accomplish a lot through more automation." There will not be any talk about setting up a production facility abroad. Swarttouw: "We've always been interested in internationalization, and in that context we've got our eye on the market in the United States in particular. The timing's wrong now, however. We should have done it earlier, or we'll do it later. Right now the pressure's too great. And as I said before, we have neither the people nor the money for that."

Last year at the Le Bourget Air Show Swarttouw spoke with the proper scepticism about the propfan engine that Boeing claims will power the 7J7 in 1992. One finds the same shrugged shoulders at Airbus. Nonetheless, all the self-respecting aircraft engine manufacturers are working intensively to develop this new engine.

The propfan is a jet engine that drives a disk with sharply curved propellers attached to it. There are already countless variations on this theme; these include having a pair of disks turning in opposite directions with an odd or even number of blades, hiding the blades in a casing, and using a gearbox. And each manufacturer has thought up its own name for the propfan.

All the engine manufacturers claim the same results: speeds that today can only be achieved with jet engines, and fuel savings of up to 40 percent compared to the present generation of turboprop engines. At present there are problems with just how large the propeller blades should be and what material

they should be made of. In addition, the propfan still makes too much noise today--both for the environment and inside the cabin--which can lead to such things as premature metal fatigue. A recent General Electric test flight with a propfan proves that this last problem is anything but insoluble.

Originally promoted by Boeing as /the/ [emphasized in original] engine for a 150-seat aircraft, all indications are that the propfan will be suitable for just about all types of aircraft. Thus, the West German manufacturer Dornier is already studying whether the propfan can be adapted to aircraft with a capacity of 20-25 passengers. A few months ago MBB concluded an agreement with the China National Aero-Technology Import and Export Corporation (Catic) to study the possibility of an aircraft with a capacity of about 80 passengers. This MCP 75 would be equipped with propfans. According to MBB there is a market for 900 such aircraft, while in China itself MBB sees a sure need for 250 more.

MBB spokesman J. Grendel: "We'd be happy to get Fokker involved in this project. Of course we're very familiar with Fokker from the Fokker-VFW period and right now we're still working with the company on the Fokker 100. Naturally Fokker could bring to this project its experience with the design and construction of the F 28." When asked about this, Swarttouw says that it "is still too early to answer." "We're busy talking. And there's the fact that I find the whole China situation very unclear. Too, the question is when the propfan technology will be ready. At this moment it's nothing more than everybody talking with everybody."

Swarttouw also feels it is a waste for each country to attempt to come out with its own aircraft. He is more interested in joint ventures or other forms of cooperation, particularly licensing. "That aspect's totally underrated," he says. "We did that with the F-16. The advantage of constructing under license is that you avoid duplicating development costs."

Successors

Coming back to the development of successors to the Fokker 50 and the Fokker 100, Swarttouw makes it clear that there is a difference between the Fokker 50 and the Fokker 100. In his opinion the new engine technology will "only come into play much later" with the Fokker 50, "probably after the year 2000." "With the jets, like the Fokker 100, the change will come much sooner."

If further development of the Fokker 100 should be necessary--and here the Fokker president does not say whether the aircraft will be equipped eventually with a propfan engine, which McDonnell Douglas says it will do for its DC-80--then Swarttouw feels that it is "extremely unlikely that Fokker would develop such an aircraft by itself." Intensive negotiations are already under way with Mitsubishi, although they primarily involve financing aircraft.

"But," says Swarttouw with emphasis, "when we begin a new project, it's very probable that Japan will be one of the participants." Boeing has already brought the Japanese in. At that company they say outright, "If you can't beat them, join them."

12593
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FUTURE OF BELGIAN BELAIRBUS CONSORTIUM DISCUSSED

Brussels KNACK in Dutch 10/16 Sep 86 p 20

[Article by Frank de Moor: "Airbus, Belairbus, and Other Questions"; first paragraph is KNACK introduction]

[Text] Is it possible for the private sector to take over the state-owned shares in the Belgian Airbus consortium as planned without a general plan for all aviation-related orders for the 1990's? Is it possible for Belgium to participate in the A330 and A340 programs without such a plan?

The British government's hesitation, officially denied, to pay some 90 percent of what British Aerospace needs to participate in the newest Airbus A330-A340 is indicative of the uncertainty that prevails in aviation circles about future plans for these aircraft and for Airbus Industrie in general. It is a well-known fact that the state-owned Walloon firm Sonaca, the French-Netherlands company Sabca, and the Brussels firm Asco have been tinkering together on the Airbus A310 for ages. Watteeuw from Bruges was able to work on the A320, while ADB and Barco Industries have a finger in the pie indirectly. But in all this time the shareholder structure of NV Belairbus, Airbus Industrie's Belgian partner, has not been adjusted.

Just before the change of government at the end of last year, Jean-Maurice Dehousse (Walloon Socialist Party), who was then chairman of the Walloon Executive, prevented Belairbus from going entirely into private hands; above all, he prevented the Flemish Executive from joining the management council in its turn. That was in July 1981 under pressure from the newly-established Flemish Aerospace Group (Flag), which was decided on by the then government. Today, 5 years later, things are no further along. Worse yet, Flag has lead in its wings, and the ministers involved are beginning to wonder whether the structure of Belairbus really needs to be modified, now that the A310 and the A320 projects are under way and there are more and more doubts about the A330 and the A340. The A330 was to be a two-engine aircraft capable of carrying around 310 passengers 9,300 kilometers. The A340 was to have four engines and only 260 passengers but a longer range.

Not only would these aircraft have to compete with the planned newcomers from McDonnell Douglas and Boeing (the latter is also betting on the newest propfan engines), but they also promise to do Airbus Industrie very little good

financially. The four Airbus partners (France and West Germany with 37.9 percent each, Great Britain with 20 percent, and Spain with 4.2 percent) have already invested no less than $10 billion in Airbus aircraft since 1970, but so far scarcely one tenth of that has been paid back. That means that Airbus will either have to limit itself to the A310 and the A320 or dare to fly forwards with the A330/A340.

Multiyear Plan

However, Belgian national and provincial authorities have already invested so many billions in the first Airbus programs that Brussels too is asking more and more insistently what is to be done now about the financing and structure of Belairbus. Some immediately link this to the broader question of what is to be done about the Walloon-Brussels aviation industry and with the Flemish ambitions in that field.

Others wonder whether the time is not ripe to draw up a major interministry multiyear plan including all possible aviation-related orders up to the end of this century. This would allow the Ministries of Transport (read Sabena), Defense, Scientific Affairs, and Economic Affairs; the provinces; and the private sector to coordinate their plans; they would take the plan into account in any further expansion of their industrial capacity.

This would also make it possible to hold the discussion of possible participation in the A330-A340 in a broader political and industrial context. This would include Belgian participation in the replacement for the helicopters and the Mirages; the production of new antitank missiles; new communication, command, and control systems; and further European space programs. The Ministry of Defense has postponed all purchases for 2 years, but nothing prevents the government and the private sector from getting involved now in the development of new aircraft.

This would also put an end once and for all to the vain efforts by former Minister of Defense Freddy Vreven (Party of Liberty and Progress) and his then colleague at Economic Affairs, Mark Eyskens (Social Christian Party), to compensate indirectly for military orders. Many of these programs are just starting up and therefore still provide adequate opportunity for full participation in development and production.

12593
CSO: 3698/065

BRIEFS

FRG WORK IN CFM-56-5 ENGINE--Paris--The German company KHD Luftfahrtechnik and the French engine manufacturer SNECMA have reached a cooperation agreement on the French-German jet engine CFM-56-5, which will power the Airbus A-320, it was announced on 23 September by SNECMA. KHD Luftfahrtechnik thus becomes the third European partner to join SNECMA in this program, after Belgium's Fabrique Nationale (FN) and Norway's Kongsberg Vapenfabrikk, stated the French company in a communique. The two companies, SNECMA and KHD have already cooperated on the fabrication of the Larzac engine for the French-German Alphajet. [Unsigned article] [Excerpt] [Paris AFP SCIENCES in French 25 Sep 86 p 24] 11,023

CSO: 3698/137

SIEMENS IN SUBORDINATE ROLE IN JOINT VENTURE WITH BASF

Munich COMPUTERWOCHE in German 7 Nov 86 pp 1-2

[Article: "Big Companies Go Halves in Joint PCM Venture: Siemens and BASF Now Pulling Together"]

[Text] Frankfurt/Munich (CW)--The alliance between the electronics giant and the chemical giant has been sealed. The new subsidiary of Siemens AG and BASF AG in the compatible computer market has been established.

According to joint statements by the "parents" the new enterprise is the largest supplier of compatible computer systems in Europe. The thus far nameless child is to be christened sometime this year. BASF and Siemens expect no objections from the government cartel office.

With 80 million marks of original capital the joint venture will begin activities on 1 January. While the financial participation has been placed on a 50-50 basis, the division of responsibilities in the management reflects the varied points of emphasis in the new company's commitments. The BASF controls sales and technology and assigns the chairmen of the managerial crew. Subordinate positions--apart from merchandising management--fall to the lot of Siemens. Thus Rolf Brillinger will take over the chairmanship of business management; likewise BASF people, Hans Dieter Jonescheit and Ramon Gil, are being delegated to the panel. The former in addition to being sales manager will also be in charge of marketing; the latter heads the technology area. The Siemens people in business management are Horst Kinzius-Franken (chief of finance and Brillinger's deputy), Detlef Jaeschke and Hans Sterr (directors plenipotentiary respectively for sales and engineering customer service domestically).

The new firm aims at achieving more than half its sales of "more than 1 billion marks" in 1987 domestically. This statement reflects the fact that there is no fixed commitment to expansion in this area: last year the BASF data technology branch had sold equipment totaling 600 million marks, to which must be added Siemens' approximately 500 million in the main frame area (without BS-2000 computers). But it is true that Prof Manfred Heckle, manager of the BASF information systems division, announced that his branch has thus far this year accomplished a plus of 25 percent in compatible systems. This would suggest a drastic sales reduction at Siemens since announcement of the licensing disputes between IBM and Siemens' supplier Fujitsu.

The second data processing sales item of the Ludwigshafen people, storage media, will stay in the parent chemical company. There is talk of a total of 1,000 workers in the new operation; the BASF share in the staffing will probably be about 800 employees, of which 400 work abroad.

In first reactions within the branch to this consolidation of the two PCM operations, insiders have increasingly doubted the survival chances of the rival NAS in the German market. On the other hand, effects upon Nixdorf are considered less likely, with the Paderborn people continuing to procure their Hitachi computers from Ludwigshafen.

8008
CSO: 3698/121

FRG STUDIES ADVANCED COMPUTER ARCHITECTURE IN 'SZENARIO 90'

Munich COMPUTERWOCHE in German 7 Nov 86 p 4

[Text] The Society for Mathematics and Data Processing, Ltd (GMD) in Birlinghoven plans to make an international name for itself by the end of this decade with its computer development program "Szenario 90."

Friedrich Winkelhage, the managing director, argued that the primary objective must be to make the necessary tools available to GMD researchers. He estimated investment for the major project at about DM 170 million, but participation by the state and the Land North Rhine-Westphalia was still unclear.

The major West German research institute's master plan anticipates 850 work station systems and 10 supermini laboratory computers, at a cost of DM 70 million. Four ISDN-capable substation installations are to create the link between the computers at the various GMD locations. Birlinghoven puts the rental costs at DM 48 million, software and followon costs at DM 17 and DM 34 million respectively. An additional DM 10 million is to go into the E.I.S. (Design of Integrated Circuits) program; there are plans to conduct test operating sequences of prototype chips, which will be developed at universities.

One of the "Szenario 90" subprojects is the development of new computer architectures with the appropriate programs; one of the development sites is an experimental laboratory which is still to be built; "Suprenum" is the determining key word. User-friendly operating procedures and a computer network are also components of the research project.

The GMD does not see the increase in research performance as being realized through financial efforts alone. In conjunction with Berkeley University in California, the Insitute intends to support West German information specialists. The success of this campaign, however, is still dependent on the decision of the Ministry for Research in Bonn, which has not yet determined if it will provide DM 1.3 million in startup capital.

9581
CSO: 3698/117

AEG CONTRIBUTES TO ESPRIT 'FACTORY OF FUTURE' PROJECT

Munich COMPUTERWOCHE in German 7 Nov 86 p 59

[Article: "Research Chief Has Drawn Interim Balance for Esprit Participation: AEG Raises Stakes in European Community"]

[Text] Frankfurt (vwd)--The AEG [General Electricity Co.] is remaining an active partner in the European Research Union. This has been the conclusion drawn by Volker Lehmann, head of the research division of that company. He was referring to the participation of the AEG in the Esprit program of the European Community. The Daimler-Benz subsidiary wants to give special emphasis to communications technology.

In his interim balance for the still current phase of Esprit, in which the AEG is participating in 23 individual projects, Lehmann reported that his enterprise in 1985 had invested 850 million marks in research and development and that this represented about 8 percent of his total sales of about 11 billion marks. This sum invested in research and development is divided among the microelectronics, optoelectronics, and power electronics divisions and also the propulsion technology division. In the development of an expert system intended for use in the "factory of the future" in the domain of manufacturing control the AEG is working with 12 partners from industry and business, including software houses, large-scale research facilities, and universities.

In planning for the "factory of the future" the company aims to set up a basic system which will be "future-safe" in its architecture and will assure a data link with the administrative area. The technology concern has already taken a step in this direction in installations which are now either under contract or in the planning stage. These are installations for the automation of a printing press, of a paint shop, and of a clarification plant.

The core and backbone of the basic system designed by AEG are the communication systems for the data link. In these the AEG is providing for three systems having differing capacities and characteristics. For the information-theoretic integration of the largely administrative work centers a communication system is provided which is primarily oriented toward large-scale data throughput and the coupling of equipment produced by different manufacturers. To this end there are provided bus systems and communication conventions on the basis of MAP (Manufacturing Automatic Protocol) and TOP (Technical Office

Protocol). For the close-to-process technological domain a communication system is employed which is based upon serial buses. According to the ideas of the AEG this latter will be an EPA-MAP (Enhanced Performance Architecture-MAP) whose international standardization began some months ago.

At the present time yet another AEG-specific engineering approach is being used which is configured in such a way that essential interfaces are conserved during the transition. At the lowest level the communication system is supplemented by the field bus which supports the data traffic between central data processing units and the in part broadly dispersed close-to-process units such as sensors and "active" units. Another essential feature of the AEG basic architecture is cluster formation which combines all equipment and computer devices required for the guidance of a subprocess. This combination via a real time bus like EPA-MAP yields a largely autonomous system. Individual clusters can be directly coupled to one another through the superior MAP bus or Gateways.

The AEG has committed itself to open standards. With the introduction of MAP and TOP at the upper level a first step has been taken in this direction. In the domain of the real time bus it is expected that EPA-MAP will be introduced as soon as the international norms have been agreed upon.

8008
CSO: 3698/121

MILITARY ELECTRONICS R&D FAVORED

Paris ELECTRONIQUE ACTUALITES in French 17 Oct 86 p 2

[Article by R. V.: "More Military R&D and Less Civilian Expenditures"]

[Text] While government fund allocations to nationalized enterprises in the electronic field are much lower for 1987 than for 1986 (500 MF against 1 billion francs), appropriations for the development of the electronics industry should increase by more than 6 percent next year.

This is the information which the Ministry of Research and Higher Education has just published on the "R&D budget effort" (EBRD). A new concept, this EBRD combines all public R&D endowments (military financing, PTT supplementary budget, and so on).

Next year, with the exception of capital endowments, the growth of the industry will represent a total (ordinary expenses and program authorizations combined) EBRD of 2.54 billion francs compared to 2.38 billion in 1986.

On the other hand, the telecommunications research EBRD will be stable at 3.84 billion francs (1 billion for personnel and operations, 2.8 billion in capital expenses).

For the civilian aeronautics programs, the EBRD drops by about 2 percent below 1986, to 2.1 billion. Also lowered is the Anvar budget (726 MF compared to 746 MF). By contrast, the research tax credit is increasing (1.1 billion against 1 billion), as is the laboratory equipment budget of the Devaquet ministry (1.440 billion compared to 1.406 billion). Lastly, it is still the Ministry of Defense EBRD (research, development, tests) which increases the most from one year to the next: 19 percent, to 30.7 billion francs.

Adding all the "civilian" appropriations in the industry (aeronautics, telecommunications, capital endowments, and so on), we find a total package of 9 billion francs compared to 9.8 billion in 1986, for a drop of nearly 9 percent.

1987 will be an especially good year for military electronics.

11,023
CSO: 3698/137

ITALIAN SURVEY OF WORLD ELECTRONIC MARKETS

Electronic Market Survey, Part I

Milan AUTOMAZIONE E STRUMENTAZIONE in Italian Mar 86 pp 96, 97

[Unsigned article: "Survey of Electronic Markets"]

[Text] On the occasion of publication of the 20th issue of this journal, the research department of BIAS-Microelettronica initiated and conducted a survey of a significant sampling of leading companies to determine the state of health of the markets in which they operate.

The survey, which also includes data reported in studies by specialized American and European companies, is designed to present a concise picture of the situation that has been evolving in the recent past, and above all to project demand, price, and technological trends into the immediate future. This first of several parts presents findings for the electronic components sector, which is the broadest and most complex of the areas. The findings are subject to a certain amount of modification following definitive processing of the data assembled.

Electric Components Sector

Market

For electronic components (which represented more than 50 percent of the BIAS Microelettronica 1986 sample), and especially silicon components, 1985 was a bad year. No one expected it to be as disastrous as it actually turned out to be. Not a single observer had discerned the depth of the crisis ahead of time and sounded the alarm over a trend which forced almost all major industries to resort to emergency measures, and in some instances even to make significant industrial and commercial strategy modifications. Hence 1985 may surely be characterized for semiconductor manufacturers as the most difficult year in their history. In the United States and Japan, the very sharp drop in sales worsened as the months went by. It is significant in this context that the Japanese decided twice in 12 months to revise the investment programs scheduled for the year. Some major industries were forced to cut back as much as 50 percent.

In the United States the drop exceeded 25 percent in terms of value. There were two primary factors leading to the excess of supply over demand, the

expectation of even lower prices on the part of users, coupled with introduction of new products, and the need to lower management costs during a period of business difficulties in various sectors of the electronics industry. These difficulties were revealed by financial results often well below the levels estimated at the beginning of 1985.

Europe fared better, and Italy felt even less than other countries the repercussions from developments in the semiconductor and other electronic component sectors.

The positive trend in the first 6 months was followed by more doubtful progress during the second half of the year. Companies deriving from industries in the dollar area generally experienced more problems because of the high exchange rate reached by United States currency.

Finally, the Italian market more or less maintained its position, even if price rises did not always offset price decreases. The drop in dollars corresponded to a rise in lire on the market. All sources consulted agree in predicting a reversal of the trend for 1986 in both volume and price. The Italian market is a rather special one. A single company controls one-fourth to one-third of demand, and its actions can thus influence the trend in one direction or another. Its actions currently favor the market.

In order for prices to recover this year, the market must record a growth no lower than 10 percent, on a basis comparable to that of 1985. There is no lack of signals indicating a revival, and what is highly significant is that these signals are coming from all sectors of consumption. This trend should continue to gain strength and then settle down at an annual average rate of 20 percent over the 1986-1988 period.

In the area of semiconductors, the survey conducted by the BIAS Microelettronica research department shows that the volume of the Italian market can be estimated, by means of different but not overly discordant data provided by the companies polled, at slightly more than 1,000 billion lire, as against around 900 billion in 1985.

The figures are doubled if other types of components are included. One source consulted arrives at an estimate for the total Italian component market of around 2,200 billion lire in 1986.

The most probable distribution of turnover in components among market sectors is 40 percent for data processing, 20 percent for telecommunications, 18 percent for automation and process control, 12 percent for civilian electronics, 6 percent for the automotive industry, 3 percent for military and space, and 1 percent for other sectors. The long-term trend is toward increase in the telecommunications and automotive sectors, stabilization of data processing, and contraction of civilian electronics.

Prices

A gradual return to stability is projected, following the excessive rise in 1984 and the excessive drop in 1985.

In the case of individual components, the drop in 1985 remained at the world level, below 10 percent, that is, within physically possible limits. The average drop for integrated circuits may have been around 40 percent, while it reached 60 percent for memory units or even more for some types of devices. The price of dynamic RAM units, for example, decreased one-fifth relative to 1984.

THE SEMICONDUCTOR MARKET

(Figures in Billions of Lei)

Country	1985	1986	Variation
Italy	890	1,010	13.5%
Europe	8,200	9,400	14.6%
Japan	13,500	15,400	14.1%
United States	18,600	22,400	20.4%
Total	41,190	48,210	17.00%

Source: BIAS Microelettronica research department studies.

This caused enormous difficulties for manufacturing firms in the United States, which in quite a few cases have been forced to discontinue production of these components or to have themselves acquired by stronger companies.

The Japanese companies are currently the only ones manufacturing dynamic memory elements at a cost allowing them to turn a profit, with the exception of EPROM and EEPROM, which still allow more or less everybody to have significant profit margins.

The future holds realignment of product cost and market price. This is already projected for products that were subjected to the greatest stress of the
events of the last 2 years. The survey revealed a widespread conviction that an average price rise of 5 to 10 percent will be possible for all products in 1986 and that the increase will be greater for memories and microprocessors. After the realignment period there should be a return to the traditional rule that, with performance remaining equal, there is a price reduction of 10 to 15 percent each year. This finding will be confirmed at BIAS Microelettronica in Milan between 18 and 22 March 1986. Marketing strategies and techniques will probably carry more weight than in the past in efforts to influence customers.

Technology

In contrast to the behavior of the market, the evolution of technology has been more or less positive in the recent past.

The principal events have revolved around 32-bit microprocessors (the approximately 20 companies already capable of supplying this chip are adding several other similar ones, crowding an area which, despite the best of

development prospects, probably will not be able to support all these manufacturers); SMD (surface mounted devices), which foreshadow revolutionary changes in assembly techniques as well as promotion of future redimensioning of electronic systems; gate arrays, which, without the need for extensive promotion, have rapidly come to be used in Italy, which has shown itself to be receptive to this innovation; power MOS, for which great success is predicted expressly in 1986; and special integrated circuits for telecommunications, considered to be a crucial area in the future. All the sources interviewed pointed to SMD technology as one of the most significant technological developments of 1986.

As a matter of fact, the status of this technology (and of the components that it involves) and its future prospects have been the subject of speculation and a wide variety of statistical treatments.

It is definite that the range of available SMD components has been growing rapidly, to the point that, while 3 years ago it was thought that 15 percent of components could not be converted to this technology, now even potentiometers and connectors are on the point of becoming capable of conversion to it.

The volume of sales of SMD components worldwide is currently estimated to be around 40 million dollars, with 110 million, corresponding to a market penetration of 40 percent, projected for 1990.

The response to SMD technology has proved to vary on the major markets, although up to the present the Japanese market has been the most receptive (and will probably remain so in the future). Sharp increases are nevertheless predicted also on the European and United States markets.

An important role in promotion will thus continue to be played by component manufacturers, who will be faced with problems primarily in terms of investments, sophistication of manufacturing processes, and flexibility in production.

For these reasons, the number of component factories will generally tend to decrease, despite the predicted growth of production.

Also from the technological viewpoint, the BIAS Microelettronica survey has revealed that there will be two other particularly interesting aspects in the form of "silicon foundry" agreements (original design, production by third parties), as a result of the pronounced tendency of large manufacturers to carry out the component design stage in house, and upgrading of production equipment because of the increasingly short lifetime of electronic components in general, and memory devices in particular.

Other Considerations

The companies who took part in the survey report an increase in the value of their sales of semiconductors equal to or greater than the growth of the market, which, as we recall, was 8 to 10 percent in lire, while the market decreased 7 to 8 percent in terms of dollars.

Employment levels have remained stable. There have been similar findings for the Italian semiconductor industry. Despite the great number of difficulties in which it found itself especially in the second half of 1985, Italian industry has avoided resorting to traumatic measures on behalf of employment such as falling back on the unemployment compensation fund and temporary production shutdowns.

No increase in the number of jobs is predicted for 1986. However, employment should rise over the 1987-1988 period when the recovery becomes stronger.

THE ELECTRIC COMPONENT SECTOR IN ITALY
Summary

Market

1985 was disastrous.
Recovery is expected in 1986.
Stabilization is predicted for 1987-1988.
The market held more or less steady in Italy.
Consumption in terms of lire increased in 1985.
An increase exceeding 10 percent is expected in 1986.
Figure is around 1,000 billion for semiconductors.
Figure is around 2,000 billion if other electronic components are included.
+20% in 1987-1988.
Data processing leads with a 40% share.

Price

Extreme drops in 1985.
-50% and more for memory units.
Return to stability expected.
Average increases of 5-10% expected in 1986.

Technology

Radical changes in assembly techniques with SMD.
Italian designers good at learning the advantages of gate arrays.
Many 32-bit microprocessors on the threshold of vigorous growth.
Success is assured for power MOS and dedicated chips.

Electronic Market Survey, Part II

Milan AUTOMAZIONE E STRUMENTAZIONE in Italian May 86 pp 160, 161

[Unsigned article: "Electronic Market Survey"]

[Text] The March 1986 issue of AUTOMAZIONE E STRUMENTAZIONE published the first part of this survey, which dealt with the component market in general and the pertinent technologies. The study is divided into four parts and covers the most significant aspects of various types of accessories, subsystems, instruments, etc.

This second part examines ATE technology; the two remaining parts will appear in future issues.

Following the discussion of electronic components, the results of the survey initiated and conducted by the research department of BIAS-Microelettronica of a significant number of businesses which manufacture, sell, and install automatic test equipment are presented in what follows.

The results are supplemented by data contained in market studies conducted by international companies specializing in business-sector research.

Automatic Test Equipment

Market

Over the last decade, ATE (automatic test equipment) has developed steadily until it has come to represent about one-fourth of the world testing and instrumentation market, which was estimated to be 6.5 billion dollars in 1985 and for which 7.2 billion dollars are projected in 1987 and more than 11 billion in 1989.

As recently as 5 years ago, ATE was little known outside a small group of specialists using the equipment and was depreciated by management. In the last few years the quantitative and qualitative growth of industrial automation has been paralleled by reexamination by management also of the problems connected with testing activities. ATE systems above all have derived the benefit of this reexamination, as they have also benefited from greater integration into operations, primarily in CAE (computer aided engineering).

This is by way of introduction to a category of systems which, suffering a much less traumatic downturn than did semiconductors, has a highly promising future ahead of it. Indeed, ATE has an important part to play in building the factory of the future, no longer as equipment with limited functions but in a broader context. Testing of cards and components will be increasingly integrated into the data management system of companies. Testing is a factor determining the quality of the manufacturing process, and will be an ever more important such factor in the future.

Major users are displaying a high degree of maturity and receptivity to this opportunity, and the more discerning among them are also alive to the benefits that can be derived in terms of quality improvement and thus of productivity.

In some respects, the slump of 1985 was occasion to pause, reflect, and compare, a necessary and desirable one for persons who have the task of drawing up economic and technological investment plans.

As in other categories of electronic products, the pronounced slump in demand in the United States was matched by stable progress in Europe.

In Italy there have been positive signs that should find expression in 1986 in increased demand for ATE. In the study conducted by the BIAS-Microelettronica research department, the largest sampling of the sector, the 20th version of which was completed in Milan between 18 and 22 March 1986, predicts

an increase of 15 to 20 percent, possibly as high as 25 percent if telecommunications and the industrial sector (the one made up of traditional machine-oriented companies which have added control electronics to their own equipment) keep their development promises and if the value of the dollar settles down at the current rates.

The volume of this market can be rated at around 40 billion lire, but the figure could be raised by installation of a few major testing systems.

The anticipated rise may seem to be high, but it must be remembered that in recent years the Italian market has exhibited reaction times relative to the United States considerably shorter than in the past (around 6 months, as against 2 years at the beginning of the decade). The narrowing of the gap has resulted in very lively demand. This demand should continue to grow, following the pause in 1985, also because of the lag which Italy continues to display relative to other industrially advanced countries, and Japan in particular.

THE ATE SYSTEMS MARKET, 1985 ESTIMATES AND 1986 PROJECTIONS
(Figures in Billions of Lei)

Country	1985	1986	Variation
Italy	35	41	+17%
Europe	482	530	+10%
Japan	504	570	+13%
United States	1,550	1,720	+11%
Total	2,571	2,861	+11.3%

Source: BIAS Microelettronica research department studies

The market for these systems is generally divided into 2 segments: the in-circuit testing segment (which is the more consistent) and a function testing component, according to whether the testing is done with reference to circuits or the functions performed by a chip with operating integrated circuits. To be more precise, ATE systems test a chip by checking the individual components, on the assumption that the aggregate (the chip) will perform as it should if the components perform well individually. Functional systems, in contrast, test a chip by simulating its functions, without verifying the efficiency of the individual components.

Technology

A significant harmony of opinion has been observed in this area. The outstanding innovation in the near future will be development of hybrid testing systems in response to the incorporation of analog and digital technologies into one product, along with development of dual-function systems performing both in-circuit and function testing. Another important innovation is represented by integration of ATE with other equipment used in a plant. This trend, which has already been observed at the design level in recent years, is now extending to the production level. Data acquired and processed by a testing station can accordingly also be used for planning stock levels, orders, etc.

For the moment, attention is fixed on connecting ATE to CAE systems. Such connection avoids rewriting of programs on transition from one stage to another, thereby reducing the time required for completing an operation. The object is to integrate all the systems of a plant in accordance with the CIM (computer integrated manufacturing) process. This approach can be applied only by highly sophisticated users whose entire production is electronically automated, and for the time being such users are represented by major companies (also because of the significant investment involved).

Research has shown that some suppliers of ATE systems are pushing this philosophy even to the point of wanting to develop a tester for every type of component present (some companies have already started promoting and selling such systems). This process is further intensified by the introduction and wide use of new components and technologies, above all semi-custom devices and SMD components. Some are also considering systems for testing modules (assembled units positioned between chip and board).

In addition to the technological developments associated with testing systems, mention should be made of the efforts in progress at the engineering standardization level for development of communication protocols for connection of dissimilar machines of different makes. One example of this is the MAP (manufacturing automation protocol). It is premature, however, to expect high-resolution optical testing systems. They will find a market, even a substantial one, in 4 or 5 years.

Prices

Stability or slight reduction are the 2 general indications given in almost all the replies received in connection with the projected behavior of prices in 1986 and 1987. The fall of the dollar argues for variation in prices, along with expansion of demand. The survey conducted by the BIAS-Microelettronica research department also predicts an increase in the percentage of systems manufactured in Europe (the bulk of them will, however, continue to come from the other side of the Atlantic). This situation as well should have a positive effect on the behavior of prices.

According to one European designer, European technology has now come to equal that of the United States and has the advantage of being available at lower cost.

Lastly, a smaller hardware margin is accompanied by higher profits on applications software.

Other Considerations

The contacts with the firms surveyed by the research department of BIAS-Microelettronica also revealed a substantial change in the approach to investments by these companies. An effort was previously made to optimize the level of use of investment capital, while now the effort is to maximize the level of employment of personnel, and investment capital is viewed as a function of this objective, regardless of whether it is utilized to its full potential.

Such planning should have a negative effect on employment, even though substantial stability is to be expected over the next few years.

A tendency toward increase in employment has been observed at the level of the firms manufacturing and selling ATE systems.

Lastly, marketing techniques appear destined to be revaluated because of the increased pressure of competition, but also because of the increase in user knowledgeability.

THE TESTING SYSTEM SECTOR IN ITALY
Summary

MARKET

Pause for reflection in 1985.
Widespread recovery in 1986.
A rise of 20%, representing a value of around 40 billion lei, expected in Italy.
ATE becomes an integral part of the automated manufacturing process.
ATE-CAE integration has already begun.

TECHNOLOGY

Composite systems will be added to in-circuit and functional systems.
Ad hoc ATE systems and ones for module testing are making their appearance.
Testing/inspection systems equipped with means of visions will become a reality in 1986.
Moving from the design stage, integration of ATE with other plant equipment will be extended to production.
Communications protocols will assume growing importance.

PRICES

Stability or a slight reduction is expected.
The low dollar exchange rate favors price policy (as well as market policy).
The best profit margins are currently obtained with software products.

Electronic Market Survey, Part III

Milan AUTOMAZIONE E STRUMENTAZIONE in Italian June 86 pp 162-163

[Unsigned article: "Survey of Electronic Markets"]

[Text] Now that the results of the survey of electronic component and automatic testing (ATE) systems have been presented, the area of laboratory instrumentation is to be covered.

This segment presents data and comments from companies in business in Italy, to which are added data contained in market research studies conducted by prominent international companies.

Laboratory Instrumentation

Market

In view of the level of maturity reached, the world laboratory instrumentation market entered a stage of stabilization in 1985, but is was a stage which did not affect all of the many sectors into which the market is subdivided.

The slump was avoided to a greater extent in Italy than elsewhere, as proof that the Italian electronic products market fared better on all fronts. In some instrumentation sectors demand increased in volume, while it increased almost everywhere in terms of value.

THE LABORATORY INSTRUMENTATION MARKET, 1985 ESTIMATES AND 1986 PROJECTIONS
(Figures in Billions of Lire)

Country	1985	1986	Variation
Italy	298	330	+11%
Europe	3,100	3,380	+9%
Japan	1,810	2,080	+14%
United States	4,980	5,328	+7%
Total:	10,188	11,118	+9%

Source: BIAS-Microelettronica research department studies

The survey conducted by the BIAS-Microelettronica research department has shown that, in the aggregate, while demand has remained stable in terms of volume at 1984 levels, there has been an increase, often in double digits and very pronounced especially in the first half of the year, essentially because of the revaluation of the dollar.

Since Italy has no significant instrumentation industry, despite the capabilities of a submerged sector struggling to come to the surface, this has favored the entry into Italy of products from areas other than the dollar area, primarily instruments "made in Japan." Things have been made easier for the Japanese by the relative stability of their currency, and they accordingly have been able to market instruments, especially basic ones, that are competitive in terms of performance and price.

In 1986, in view of the drop in the exchange rate of the dollar and appreciation of the yen, there should be a return to a situation very similar to the one that existed previously, despite the predictable reluctance of the Japanese to relinquish the share of the market that they have won.

As was to be expected, the survey revealed the existence of understandable differences in viewpoints regarding the values to be assigned to the laboratory instrumentation market, because of the different ways of interpreting and understanding the world of the equipment in question.

Closer agreement of estimates, if not complete coincidence, was found in the matter of the volume of business generated by individual product segments.

Taking the average of the data furnished yields an aggregate value for 1985 of around 300 billion lire. However, the figure also includes development systems, which properly speaking are not measurement systems in the strict sense of the term, and a large share of specific systems of the telecommunications industry. In other market surveys these systems are not counted or are considered separately.

If we disregard the telecommunications sector, which accounts for 80 to 90 billion lire of the figure furnished, the most widely sold products in 1985 were oscilloscopes and development systems. The estimate for oscilloscopes, including low-band equipment, is approximately 30 billion lire. A slightly lower figure is obtained for the latter when dedicated development systems are added to the general-purpose systems.

This proportions are reversed in 1986 because of a higher rate of growth of development systems than of traditional oscilloscopes. Vigorous expansion is anticipated for digital oscilloscopes with memory, which account for about one-seventh of the total market. Recorders are at a level near 22 billion lire, while spectrum analyzers are slightly lower. These are two instrument categories which share rather modest prospects for growth, at least in the versions in which they are currently configured.

In addition to the fragmentation of the market, which does not stop with the product categories just discussed, but also includes logic state analyzers, digital multimeters, feeders, etc, there are two basic aspects which largely characterize the current development of this market. They are digitalization and integration, which are to be regarded as a joint phenomenon (the reasons for this will be given in greater detail below), and relative stability of development. Italy's share is about 10 percent of the European market and 3 percent of the world market. Demand for instrumentation reflects specific operating needs and thus should not be subject to the highs and lows of other electronic products. This explains the high stability of this market, which on the other hand is highly competitive and is made even more so by the entry of Japanese and Far Eastern manufacturers into the arena. A search is accordingly in progress for new products or solutions to be offered to users.

Some firms, including leaders in this sector, are of the opinion that the role of digital instrumentation will increase in comparison to the analog and that the individual instrument will tend to lose ground to board-mounted instruments to be used in conjunction with a personal computer.

Technology

In recent years there have unquestionably been innovations in the technology of instruments used in the laboratory, but no revolutionary developments of any kind have been recorded. The major innovation has surely been the introduction of digital electronics into the instrumentation sector.

The future holds promise of more frequent technological innovations. The survey conducted by the BIAS-Microelettronica research department has revealed three main trends in this area, corresponding to just as many viewpoints.

Some companies take for granted the introduction of instruments in the form of a logic board to be applied to a personal computer which assumes operation of the board. Manipulation of the orders of magnitude to be measured, their display, and selection of functions will be accomplished by way of the keyboard and video monitor, along with the traditional knobs and circuit breakers. These companies no longer believe in stand-alone analog instrumentation but in an integrated and programmable measuring system, personal instruments. They add that instrumentation is also to begin to be incorporated into CIM (computer integrated manufacturing).

Other companies, while acknowledging the trend toward programmable and integrable equipment, maintain that significant innovation will take place in manufacturing techniques rather than technological development of instruments properly so called. The primary aim is to improve the price/performance ratio, and so to lower production costs at the source. The proliferation of personal computers will stimulate introduction of innovations at the production as well as the design level.

A third group of firms contacted reflects a more traditional viewpoint. "Digitalization" will undoubtedly continue, but the current configuration of instruments will be more or less retained.

The color oscilloscope and ease of use, as product and method respectively, are two more technological objectives of great interest in the near future, to both manufacturers and users.

Prices

Price policies vary from one company to another and by and large reflect the behavior of the currency exchange rate on which vendors and products depend. Inasmuch as the dollar is the most commonly used currency, its depreciation foreshadows lower prices for products coming from the United States. The situation is reversed for manufacturers whose reference point is the yen.

However, other currencies also enter into play (such as the florin and the mark). Consequently, price lists must be continually adjusted, unless an exchange rate is set annually or semiannually and assumed to refer to the entire period. This is one way of making work easier and of meeting customer requirements.

If we disregard currency fluctuations, the majority of the firms contacted by the research department of BIAS-Microelettronica confirmed a certain stability of prices at constant values, that is, the cost of an instrument will improve rather than lower the price/performance ratio as a result of the addition of new functions and capabilities.

THE LABORATORY INSTRUMENTATION SECTOR IN ITALY
Summary

MARKET

Stabilization stage in 1985.
Recovery in 1986.
Volume reached 300 billion lire in 1985.
A market growth of 11% predicted for 1986.
There will be an increase in products made in Japan.
Oscilloscopes and development systems contend for first place.
Market fully developed, but competition fiercer.
The advent of the personal instrument initiates change in generations.

TECHNOLOGY

More integration, programming, and digitalization.
Board-mounted instruments make their appearance.
Instrument manufacturing techniques change.
A digital color oscilloscope is in the offing.
Ease of use improves.

PRICES

Basic stability good.
The price/performance ratio improves.
The lower value of the dollar offers promise of products on better terms.

Electronic Market Survey, Part IV

Milan AUTOMAZIONE E STRUMENTAZIONE in Italian Jul-Aug 86 p 164

[Unsigned article: "Electronic Market Survey"]

[Text] The survey initiated and conducted by the research department of BIAS-Microelettronica on the occasion of appearance of the 20th issue of AUTOMAZIONE E STRUMENTAZIONE ends with presentation of the results for the sector of equipment for automated processing of printed circuits. The survey, supplemented by data given in studies conducted by specialized United States and European companies, has undertaken to outline the situation of the past and to characterize trends in demand, technologies, and prices in the near future.

Automated Manufacturing Equipment

This 4th and last part of the survey has been restricted to a clearly defined sector, that of automation of printed circuit manufacture, and accordingly that of equipment adapted to perform the functions of component assembly, soldering, and washing.

This is one stage in the broader process of factory automation, but is a particularly important factor in view of the importance, both economic and technical, assumed by printed circuits and consequently the boards on which

they are mounted, destined as we know to be used in an increasing number of devices and systems.

It is also an activity in which Italy has gained industrial and engineering experience representing a desirable object for acquisition by other countries.

Market

In 1985 the evolution of demand was on the whole favorable. Among the sectors into which it is customary to divide the market for industrial automation equipment, the area of machines and devices for automated processing of printed circuits was one of those least affected by the unfavorable business conditions.

There are basically three reasons for this situation. Firstly, it is during slack business periods that industries normally make investments aimed at technological upgrading of manufacturing processes and lowering costs, such as those for printed circuit processing equipment. Then there were exports as a safety valve which enabled Italian firms in this sector to maintain small-scale but extreme specialization to offset the lower demand in some areas of use in the second half of 1985. Lastly, the evolution of the electronic component sector, and in particular the advent of surface mounted devices, tended to enliven the market by revolutionizing previous processing techniques.

The survey indicates that these are factors that will contribute toward stabilization of development of the sector again in 1986 and in the near future.

There has been no lack of calls for caution. While major manufacturers continue to acquire systems for automated printed circuit processing, because, as some of the manufacturers surveyed have noted, they can in this way make production more efficient among other things by amortizing the costs incurred within a short period, small and medium-sized firms are moving more slowly, preferring to wait for technologies to evolve before making new investments.

This different approach is to be attributed in part to the cost of equipment for automatic processing of printed circuits. This cost ranges from tens to hundreds of millions of lei.

This cost range, along with the extensive fragmentation of the market, makes it extremely difficult to arrive at exact cost figures. The cost for 1985 may nevertheless be placed in the 150 to 180 billion lire range, with a projected growth rate of 12 to 15 percent in 1986 and 18 to 24 percent in 1987.

Technology

As has already been pointed out, the technology has contributed toward keeping development of the market alive, and it will continue to perform this function in the near future.

One of the aims of the technological process is to reach the lowest possible cost per soldering point in a circuit.

Insofar as equipment for automated printed circuit processing is concerned, developments correlated with particular user requirements and thus suggested by users are to be expected, rather than intrinsic development.

For the time being, attention is concentrated more on understanding and verifying the scope of the SMD phenomenon and its implications.

Prices

It must be remembered that the development forecasts made in the foregoing call for a price increase, as was revealed by the survey made by the BIAS-Microelettronica research department, lower than that expected as a result of inflation. The cost of systems for automated printed circuit processing should, if performance remains the same, decrease in real terms also because of the depreciation of the dollar.

An upward adjustment of 5 to 10 percent annually is predicted in the price lists, but this rise will be offset by improvement in the price/performance ratio more favorable to the user.

Other Considerations

All the firms which participated in the survey conducted by the research department of BIAS-Microelettronica report a considerable increase in their sales volume in 1985 (in some cases even a doubling of sales), along with increase in in-house personnel employment.

While in some cases this situation may have been favored by the youth of a particular company, and consequently by relative ease of growth, it does demonstrate the fortunate position of the sector for Italian firms, which not only have often readily sold their own technology abroad, but have also increased the share of sales volume represented by exports relative to 1984.

6115
CSO: 3698/88

BULGARIAN PRAVETS, IZOT PERSONAL COMPUTERS DESCRIBED

East Berlin MESSEN-STEUERN-REGELN in German No 5, May 86 Inside Back Cover

[Unattributed article: "Personal Computers from Bulgaria"]

[Text] Bulgaria currently exports over R1 billion worth of electronics products in 31 countries. Among these products are the Pravets and IZOT families of personal computers.

The Pravets-type computers are produced in the VEB Priborostroene i Avtomatizatsia combine.

Production began in 1982 with the Pravets 82 model. It had 48K of random access memory [RAM] and can be expanded up to 64K.

Peripheral equipment such as floppy disk drives, printers, plotters and digitizers, etc., can be connected. Programming is done in the FORTRAN and Assembler languages.

The Pravets 8M and Pravets 8D models have a new memory architecture and 64K of RAM.

The Pravets 16M model offers especially great possibilities. The 16-bit computer, with its built-in disk drive (5.25 inch, 500K capacity) runs on the CP/M, MC-DOS (sic) or PC-DOS operating systems with 256K RAM. A dot matrix printer and a six-color pen plotter can be connected.

The Pravets microcomputer family is software-compatible with the micro computers of the Apple firm.

The Pravets 82 is intended for use in the educational system and for the building of various industrial management systems. With the use of a plotter and digitizer, the Pravets 8M and 8D models make possible the creation of a CAD/CAM system.

The IZOT combine offers a computer family consisting of four modular computers:

--IZOT 1031C: 8-bit computer with 2 MHz operating frequency, 64K RAM, monitor, one or two floppy disk drives with 2x200K capacity, and the CP/M-80 operating system.

--IZOT 1036C, 1037C, 1039C: 16-bit computer with 256K RAM. With the use of three (hard) drives, storage capacity is 30 megs. The IZOT 1036C and IZOT 1037C run on the PC-DOS, MICROS-86, and the KONKURENT CP/M operating systems.

Main features of the IZOT 1036 are 256K RAM which can be expanded up to a meg, keyboard, disk drives, graphics support for a 960x240 resolution monitor. IZOT 1036 also has the OS/PRO operating systems, which allows for enhanced possibilities when using the BASIC compiler and text editor.

The IZOT series of computers are IBM-compatible, which permits the use of these microcomputers as intelligent terminals for preparation and data entry into the electromagnetic memory [ES] data processing facilities. This makes customer support considerably easier. The completely equipped IZOT personal computer can be used for the development of CAD/CAM systems in mechanical engineering, electronics, nuclear physics, theoretical mechanics, bionics, robot technology, etc., thanks to the AUTO/CAD-2 software package for drafting.

13071/12781
CSO: 2302/11

FIRST ANNUAL MEETING OF GDR INFORMATION SCIENCE SOCIETY

East Berlin VERMESSUNGSTECHNIK in German No 9, Sep 86 p 318

[Article by F. Hoffmann: "First Annual Meeting of the GDR Information Science Society"]

[Text] The first annual meeting of the GDR Information Science Society (GI-DDR) took place on 13 June 1986 in the Marx-Engels Auditorium of the Humboldt University in Berlin. The scientific panel, formed a year ago, has since gained over 800 experts from various fields (18 percent are colleagues from the Academy of Science, 35 percent are from the Ministry for University and Technical School Affairs, 27 percent are from industry, 4 percent are from education, and 16 percent come from other areas).

The status report of the chairman, Prof Hammer (Institute for Information Sciences and Computer Technology of the Avademy of Science), presented an overall view of the missions of the GI-DDR and the work of the executive committee and the technical groups. In particular, the society will increase efforts to promote the debate over fundamental problems of information science as a scientific basis of modern information and communications technologies, and it will contribute to fruitful interaction between interdisciplinary pure research and production. One task is the responsibility of the society for the so-called "observation research" for information science in its entirety. The GI-DDR is planning to hold its primary scientific conference "INFO '88" at the beginning of 1988. The executive committee is currently concentrated on planning "Training" and "Advanced Training" activities. The staging of the "COMBI '86" (Computers in Education) technical conference from 18 to 20 June 1986 is among these activities.

In accordance with orientation given by the 9th Party Congress, themes which do justice to the guide function of information science as a scientific discipline are being addressed in the annual conference's schedule of events. In the contribution by M. Peschel (Academy of Science) on "Systems Analysis and Information Science," theoretical, methodical and practical aspects of both disciplines are considered from a dialectical viewpoint. It was demonstrated that dialectical questions of the employment of information systems for decisionmaking are not solved by mathematical means. It follows that the optimization of complex problems constantly requires a cooperating approach instead of conflicting tests of objective reality. This understanding places demands on education in order to avoid falling into "pragmatism and technocratic practicism."

One extremely interesting contribution to practical "Experiences in the General Introduction of Microcomputer Equipment" in East German transportation was given by H. Strobel (Central Transportation Research Institute). The transportation industry acquired approximately 2,500 microcomputers in the last 5-year plan, and in 1986-1990 that number should be about 25,000. This tenfold increase will be supported by a "Comprehensive Program for Procedural Automation in Transportation." Among the successfully completed tasks are the widespread introduction of ticket office (computer) terminals, S-Bahn (interurban railway) on-board computers and "dialogue" automatic ticket sales machines, and there is a determined orientation towards hardware concepts as the "motor of development" which enables new software solutions. The high degree of acceptance of new microcomputer workstations was primarily attained through early incorporation, information and training/testing for the affected employees. In transportation, the next available microcomputers will be placed in large quantity in the software laboratories, so that through a "PC-literacy campaign" the trainers will themselves be thoroughly qualified.

In the contribution from O. Herrlich (Technical University of Dresden) on application of "software technology" in accordance with the Council of Minister's Decree of February 1986, he discusses theoretical and practical aspects of the realization of this central decree.

"Knowledge Processing as a New Quality of Data Processing" was thoroughly described in the contribution by F. Wysotzki (SKI). Methods of artificial intelligence provide the prerequisites necessary to reduce the great time expenditures in experiment processes by means of rules of knowledge. It also provides for the derivation of implied knowledge through the effective use of knowledge, without the prior recognition of a rigid solution algorithm.

The current state of development of local area networks (LAN) is handled by K. Garbe (IHD). Various experimental LAN's were portrayed.

An annual volume of the "GI-DDR Information" Will soon be offering information about the activities of the GI-DDR in four quarterly issues published by the GI-DDR. Included in Part 1: "What is Information Science?:" "Information-Information Technology-Information Science"; reports from the work of the technical groups and a preview of scientific events. The formation of a further technical group "Information Science and Society" is the next one planned.

13071/12851
CSO: 2302/7

HUNGARIAN PHYSICS INSTITUTE DEVELOPS HIGH CAPACITY MAGNETIC STORE

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 1

[Unsigned article: "A Lonely Mass Storage Device"]

[Text] The KFKI [Central Physics Research Institute] has created, as the result of 2 years of developmental work, the first experimental model of a large capacity, Winchester type magnetic disk store. The developmental work was supported by the OMFB [National Technical Development Committee]. Christened the DSX, the 160 M byte unit contains three 14 inch diameter magnetic disks. For the time being the heads and disks come from import; according to the plans the KFKI will prepare, by the beginning of next year, a prototype head which they developed themselves using thin film technology. A servo surface--an entire disk side--serves to position the magnetic heads. During operation the read-write heads of the DSX float about 0.4 microns above the disk surfaces. A few important characteristics: the interface surface is a standard SMD (Storage Module Drive); the average positioning time is 27 ms; the recording density is 6,580 bpi; the track density is 680 tpi; the transmission speed is 1,012 K bits per second; and the number of cylinders is 823 (of which 15 are reserve).

They are already talking about preparing for manufacture. The MOM [Hungarian Optical Works], as possible manufacturer, is conducting advanced discussions with the KFKI.

We would like to believe that the efforts of the developers will not be wasted and that the experimental model will not remain lonely and get lost because of manufacturing difficulties.

8984
CSO: 2502/14

PHAROS: NEW HUNGARIAN GRAPHICS TERMINAL

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 2

[Unsigned note: "PHAROS"]

[Text] The MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] has produced an intelligent graphics terminal providing GKS [graphical kernel system] functions meeting the international standard. The recommended applications areas are CAD, CAM, CAE, geological, architectural and business graphics. Its microprocessors are Z 8001 (master) and Z 80A (slave). Its resolution is 1,024 x 1,024 points; it can display 16 colors at once out of 4,096 hues. It can store more than 1,000 graphic segments at the same time. The data transmission speed (9,600 baud) is noteworthy.

8984
CSO: 2502/14

PROPOSED HUNGARIAN EXPENDITURES ON FACTORY AUTOMATION R&D

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 6

[Article by Gitta Takacs: "Machine Industry R and D"]

[Text] Nine economic type (G designation) OKKFT [National Medium-Range Research and Development Plan] programs were started for the Seventh 5-Year Plan with a cost prescription of 35 billion forints. The G/6 program titled "R and D Tasks for Manufacturing Automation and the Production of Electronic Tools Connected With Precision Engineering" will have a determining role in transforming the machine industry production and product structure; it is under the guidance of the Ministry of Industry with a cost prescription of 6.38 billion forints--2.1 billion will come from the centralized technical development fund, the budgetary contribution is 400 million and the predicted enterprise contribution--treated as a minimum and as a precondition--is 3.8 billion forints. It should be noted that if the enterprise expenditures are less than stipulated in the plan then the program can get less from central assets as well.

The program office operates under the patronage of the Csepel Works Industrial Center. Competitions will play a substantially greater role than earlier in the distribution of the funds. More than 250 themes, requesting about 2.5 billion in support, have been submitted for the announcement--the first period--appearing in the May IPARI KOZLONY [Industrial Gazette]. There were fewer entries than desired in which research and development institutions and producing enterprises undertook jointly to solve some development task and it can be called characteristic that the entries would like to turn to production development investment--and not to R and D--a good bit larger part of the support than is possible.

Projects expected to be realized within the framework of the G/6 program include a CAD/CAM system producing complex tools at Ikarus and the prototype of a flexible manufacturing system at the Csepel Machine Tool Factory. At the Machine Tool Industry Works and the Diosgyor Machine Factory they are working on models of metal cutting and sheet forming manufacturing systems to be created from flexible manufacturing cells. The MTA SZTAKI [Computer Technology and Automation Research Institute], Vilati and the EMG [Electronic Measuring Instruments Factory] are jointly developing a device family to control cells

and systems. The Budapest Technical University received 160 million forints for assets for educational tasks connected with the program.

Distribution of Costs by Subprograms

Designation	Total (millions of forints)
Manufacturing automation, electronic manufacturing systems	2,070
Robot technology	1,560
Precision engineering	1,570
Machine industry automated engineering design	400
Educational tasks	780

8984
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HUNGARIAN INSTITUTE COMPARES TAIWAN'S MAT-323 TO IBM PC/AT

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 9

[Unsigned article: "The Taiwan AT at First Sight"]

[Text] In the middle of September a few experts at the Szekesfehervar computer technology institute of the Kalman Kando Electric Industry Technical College received on loan a computer compatible with the IBM PC/AT for critical review.

We do not know how much the machine tallies with the ones that customers can buy from Elektromodul for 182,000 forints (and they are, several thousand customers are standing in line for one) but it seems probable that it is precisely the configuration and that the machine has been in operation before.

The purchase voucher for the machine supports our first suspicion, it gives a detailed list of what the configuration includes--just as if we were customers. (One MAT-323 basic machine; color graphics connection; serial-parallel connection; connection between Winchester and floppy disk unit; one 20 M byte Winchester; one 1.2 M byte floppy disk unit; one keyboard; one MD-3 color monitor; one power cable; one cable to the printer; MS-DOS 3.11 operating system; MS-DOS 3.1 on floppy disk; and a guarantee. We really got a guarantee ticket too, the conditions of which we could not adhere to for we had to open the case to carry out our task.)

Our second suspicion may find foundation in the fact that since spring, since delivery of the machine, not one machine has loafed around unused; but unfortunately we have an even better founded argument, which we will describe in connection with the power unit. This part is the first to be used when the machine is turned on (it takes rather much power to start the Winchester), and it is better to get through unpleasant memories.

In size and form the power unit is an exact facsimile, a clone in a clone, and looks no different from that of the original IBM. But in the nth hour of testing there was an alarming clicking after turning it off and on and there was a problem. The machine didn't work and we were forced to examine the power unit more closely. On the solder side of the printed circuit board was a resistor, or what remained of one "gone up in smoke." There were also traces of smoke at the same place on the parts side, which suggested that the

original of this resistor once went up in smoke there. We also found signs suggesting repair on a screw strengthening one of the transistors and, what the devil, this same transistor now flew off. So the failure involving these two circuit elements had happened before. The parts were replaced so the power unit worked. But it didn't get an A plus from us, that's for sure.

As long as we were already inside we took a look around. There is a striking similarity between the original IBM PC/AT and the MAT-323. Perhaps only the disk connection card is a bit more complicated; the others are the same virtually circuit element for circuit element. There is a significant difference on the memory card to the benefit of the facsimile, namely they use 256 K bit RAMs so the 1 M bytes fit on the base card with no need for an expansion card. It is just the opposite in ROM; there are two 256 K bit ROMs and two free positions in the original IBM PC/AT; because of the 128 K bit ROMs the MAT-323 uses all the positions. It is not pretty, indeed it is downright ugly, that they put four "field" pen cells into the MAT-323 for continuous time measurement. What happens if these batteries wear out? They should at least be Duracells! The IBM solution is more tasteful and more reliable.

The disk units in the Taiwan machine appear to be a newer design than in the original IBM. (It is unfortunate that only the conducting bus fixes them to the housing so that during shipment they--there is no better word for it--hang loose.) In an interesting way the outside of the Taiwan drives is more elegant, better protected; even the electronics are dustproofed.

And now we put the machine back in its case and turn it on again. Our first reproof is for the most noisy fan, our first praise is for the display, which is not only nicer but also cleverer than the original, for example that little switch with which we can switch to two monochrome settings from the otherwise color screen. (Of course, it is not a matter of indifference what the original colors were, because only certain base colors come out in the unique green or amber coding.)

Looking at it the keyboard pleased us more than that of the IBM but handling it was a little more clumsy, less sensitive to the touch. (The danger is that one instinctively presses harder, which does not have a good effect on its lifespan.)

So, now it's time to run programs on this pretty imitation. In our truly rich program library we did not find software which revealed a gap in its compatibility; it laughingly ran everything from Dbase III Plus through the "sensitive" game programs to the BASICA program of the original machine. We were not used to copies of the latter for in the original IBM the BASIC base is in ROM. Well, it appears to be here also.

It is true that the Corona Basic 1.04 provided for the machine does not use this, for it is a good bit longer than BASICA in extent. And it is a bit shorter in running time. We ran a few benchmark programs which make the Taiwan AT comparable to other machines (at least in BASIC) and while it gave time data identical with the original in BASICA it was better with Corona BASIC.

The documentation of the machine is not a facsimile of the original but it is a copy of it so we cannot say much about it. The authors might at least have led us through the striking differences.

Let us close with an apparently machine independent factor. Neither on opening the case or in running the programs have we talked about the nicest property of the MAT-323, its price. The IBM PC/AT which we put beside the MAT-323 in order to map the differences reached the country via tourist traffic and its retail price conformable to the customs valuation was more than 1.5 million. So much for the price/performance relationship and so much for why we fell in love with the computer "at first sight."

```
10 REM BENCHMARK 1
20 PRINT TIME$
30 FOR K=1 TO 10000
40 NEXT K
50 PRINT TIME$
60 END
```

```
10 REM BENCHMARK 2
20 PRINT TIME$
30 K=0
40 K=K+1
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
```

```
10 REM BENCHMARK 3
20 PRINT TIME$
30 K=0
40 K=K+1
45 A=K/K*K+K-K
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
```

```
10 REM BENCHMARK 4
20 PRINT TIME$
30 K=0
40 K=K+1
45 A=K/2*3+4-5
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
```

```
10 REM BENCHMARK 5
20 PRINT TIME$
30 K=0
40 K=K+1
45 A=K/2*3+4-5
48 GOSUB 90
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
90 RETURN
```

```
10 REM BENCHMARK 6
20 PRINT TIME$
30 K=0
35 DIM M(5)
40 K=K+1
45 A=K/2*3+4-5
46 GOSUB 90
47 FOR L=1 TO 5
48 NEXT L
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
90 RETURN
```

```
10 REM BENCHMARK 7
20 PRINT TIME$
30 K=0
35 DIM M(5)
40 K=K+1
45 A=K/2*3+4-5
46 GOSUB 90
47 FOR L=1 TO 5
48 M(L)=A
49 NEXT L
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
```

```
10 REM BENCHMARK 8
20 PRINT TIME$
30 K=0
40 K=K+1
45 A=K**2
46 B=LOG(K)
47 C=SIN(K)
50 IF K<10000 THEN 40
60 PRINT TIME$
70 END
90 RETURN
```

The Place of the MAT-323 Among Several PPCs (times in seconds)

Machine Model	BM 1	BM 2	BM 3	BM 4	BM 5	BM 6	BM 7	BM 8	Average
Apricot XENI	2.6	10.4	24.6	24.8	27.1	48.0	62.4	76.3	34.5
Sage II	5.0	7.0	13.0	17.0	21.0	51.0	64.0	180.0	44.7
MAT-323	5.0	18.8	46.0	47.1	51.7	91.0	145.8	136.5	67.7
IBM PC/AT	8.0	22.0	49.0	51.0	56.0	94.0	150.0	139.0	71.1
Olivetti M24	8.0	25.0	52.0	52.0	57.0	100.0	153.0	166.0	76.6
MAD1	7.0	26.0	55.0	57.0	62.0	109.0	168.0	173.0	82.1

8984
CSO:2502/14

MICROWAVE SEEN AS PARTIAL SOLUTION TO HUNGARY'S COMMUNICATIONS PROBLEMS

Arguments for a Microwave Solution

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov86 p 12

[Article by Tamas Kolossa: "If the Receiver is Visible...."]

[Text] Who would have thought that all one needed to get signal transmission between two distant computers was to say "Hop" [the Hungarian word is roughly equivalent to "Chango"]? What we lack is the "Hipp" [roughly equivalent to "Presto"] and without central agreement nothing will work just by saying "Hipp Hopp" ["Presto Chango", the pun evolves below].

It is well known that if the Hungarian Post Office moves every stone in the years ahead then by the end of the century the domestic telecommunications infrastructure will be at about the same level as that of a moderately developed country today. In this situation sober reason dictates that we pay close attention to every technical solution which offers a chance for real improvement. The fourth branch of the economy, informatics, is especially interested in this field for we can see well already that we cannot exploit adequately the capabilities of intelligent machines isolated from one another. According to optimistic opinions we use only 30 percent of the capacity of the computers in our country (others speak of 10 percent) and the cause cannot be only human ignorance or sloth but also that most of the machines are isolated; because of the lack of linkages they cannot make use of the results of other machines or machine groups.

Hungarian computer technology and telecommunications experts are feverishly searching for solutions which will increase the information carrying capacity of existing cables or will make use of other information carrying media--because the relative number of cable paths is decreasing due to the slow development. An example of the former was reported in the previous issue of our journal, data transmission equipment with greater speed than customary. As a bad example of the latter we might mention the apparently vain efforts of CB radio operators; one cannot build large capacity, reliable information channels with undirected, scattered radio waves.

The serious disadvantage to forwarding signals on telephone cables is that only relatively small data transmission speeds can be attained. The best equipment known today is capable of only several thousand baud. The necessary megabaud speeds can be realized with optical cables, but the price of this is too high because of the costs of cable and construction. So if the task is to transmit more and more information in the shortest possible time, as cheaply as possible, then it is worth thinking about the possibilities of microwave telecommunications.

The above train of thought is a bit polarized, but only because if those who have the authority to decide, but who are not telecommunications experts, weigh the question then they should think it through better than heretofore.... The experts of the Telecommunications Research Institute do not say that microwave telecommunications will force out every other method. But they do say--and this was voiced in the OKKFT [National Medium-Range Research and Development Plan] competition--that the concept and equipment developed by them could take over at least a quarter of all telecommunications tasks. Their proposal, however, was rejected.

But let us take a look, What does microwave technology offer? The possible radio waves--8, 11, 15 and 20 GHz frequency--can be aimed and concentrated like light so--to use the technical term--they do not pollute the ether. The signals can be transmitted in analog or digital form. Department chief Peter Vanyai and his colleagues have developed a principle for digital data transmission equipment. Microwaves--unlike longer wave length radio frequencies--cannot go through obstacles so, as with light beams, the transmitter and receiver must "see" one another. Where there is visibility building microwave telecommunications is, with great probability, more economical than laying telephone cables. To the extent that data must be forwarded over long distances or around obstacles then, according to experience, a pure microwave chain is more economical up to 2-3 hops. At the same time, between two mountains, for example, a microwave link connected to a cable network can increase economicalness. Finally, one should not reject this possibility without consideration even if a fully developed telecommunications infrastructure exists. Economicalness depends in large measure on the capacity and quality demands of the traffic. The transmission speed (capacity) attainable through radio waves is a noteworthy point in Hungary especially.

The competition proposal of the research group describes entirely universal equipment, a dainty not only for postal workers but for computer technicians as well. In the first place the equipment is suitable for simultaneous transmission of speech and data. Within certain limits one can set (key in) the frequency, data transmission speed and synchronous or asynchronous operating mode. The link can be continuous or periodic, unidirectional or bidirectional. And all this can be set by hand or by remote control, it can even be programmed in in advance. And even thus the equipment would not be substantially more expensive then one with fixed technical parameters.

According to Peter Vanyai a number of experiments prove the feasibility of the equipment. The group has the theoretical knowledge and practical experience to be able to complete a prototype within one and half years of restarting the work.

A journalist can only add: Even then there will be no "Hipp-Hopp" out of this....

Principle of Equipment Described

[Article by Peter Vanyai: "A Device From the TKI (Telecommunications Research Institute)"]

[Text] We submitted a proposal for two versions of the equipment so that we would not have to develop new equipment in every case for newer and newer traffic needs, not always have to import new equipment, but rather have equipment the characteristic parameters of which could always be adjusted to the current traffic needs.

The first version has small capacity, serving to transmit a digital signal series at a maximum speed of 128 K bits per second. The second is suitable for passing on digital signals at a maximum speed of 8.448 M bits per second. The base band parts of the two versions are common, but the structure of the high frequency part is different (see Figure 1).

Carrier frequencies. There are microwave carrier frequencies in the 8, 11, 15 and 20 GHz microwave ranges. In one range the carrier frequency can assume several hundred predetermined values at intervals of about 100 MHz.

Transmission speed. The transmission speed can be varied within broad limits. This is made possible in the equipment by the digital phase locked loop used to obtain the clock signal (see Figure 2). We can set the natural frequency as needed with the programmed distributer which can be seen in the figure.

Making use of the transmission speed. The equipment can be developed to provide multiplex type services; then it has a number of synchronous inputs and outputs, that is it is possible to use the transmission path several times.

Use of special line coding. The information can pass through the microwave line in NRZ or biphase format; there is a way to choose between the two possibilities.

Synchronization relationships. One can develop independent synchronous directions or a synchronization loop (see Figure 3). This possibility is very useful for linking to an integrated services digital network (ISDN).

Continuous (or burst) operation. In addition to continuous operation there is a method for periodic operation suiting modern "packet switching" communications.

Development of a separate service channel. When using biphase line coding there is a way to realize a simple and independent service channel the maximum speed of which is about 5-8 percent of the transmission capacity.

Setting operating parameters. The operating characteristics mentioned, together with other parameters, can be set in a fixed way (by wiring) but there is also a way to change the parameters by remote control.

The equipment consists of two main parts. The microwave unit, together with antenna, is placed on a roof or on a tower built for this purpose. The signal manager and interface are located near the source/drain. There is a wired link between the two parts of the equipment, with a maximum length of about 300-400 meters. Naturally the multipurpose nature of it includes development of an interface meeting the needs (V28, AMI, HDB_3, etc.). With the equipment one can bridge 5-20 kilometers in one hop depending on the location. Several years ago we developed a successful link between Varoshaz Street and buildings on the corner of Vaci Road and Gogol Street.

DESCRIPTION OF FIGURES

Figure 1. Version 1 and version 2 are shown. The blocks in version 1 are, reading from left to right, "source/drain," "multipurpose interface," "multipurpose signal manager" and "multipurpose radio part for very small capacity digital signal transmission." The blocks in version 2 are "source/drain", "multipurpose interface," "multipurpose signal manager" and "multipurpose radio part for small and medium capacity digital signal transmission."

Figure 2. Reading from left to right and from top to bottom the blocks after the "received signal" are "nonlinear element," "detector," "sequential filter," "processor logic," "q controllable distributer," "N programmed distributer," and "F. stable master frequency generator." The formula given with the figure is for the natural frequency.

Figure 3. There are two parts: a. is the independent synchronous status by direction and b. is the synchronous loop. "Forras" means "source," "A" is the transmitter and "V" is the receiver.

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HUNGARIAN EXPERTS ON USES OF PUBLIC VIDEOTEX

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 13

[Unsigned article (roundtable and note): "Public Videotex on the Threshold"]

[Text] Videotex systems perform wide distribution of textual and graphic information entirely by electronic means. Combining communications technology and computer technology they make possible an entire series of professional and private use information services. The Hungarian Post Office will soon introduce a public, experimental, interactive videotex service. We talked with a few experts especially interested in the theme regarding how they saw the use of videotex and its possible role under domestic conditions. Our partners were Huba Bruckner, SZAMALK [Computer Technology Applications Enterprise], Jeno Gal, SZKI [Computer Technology Research Institute and Innovation Center], P. Laszlo Kovacs, MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences], Lajos Nobik, Orion, Endre Parlagi, KSH SZUV [Computer Technology and Management Organization Enterprise of the Central Statistics Office] and Peter Szakacs, Orion. Attila Kovacs represented our journal at the roundtable. It appears from the answers that the opinions differ from one another on several points. Our goal was simply to make public the differences in opinion and thus contribute to turning into an appropriate path the debate surrounding the domestic introduction of interactive videotex systems.

A.K.: When introducing public and closed-circuit videotex systems the first question is the terminal standard, choosing the display (and technological) level. On the basis of what viewpoints should the domestic terminal standard be chosen; what display level should be recommended?

P. L. K.: One must choose first of all on the basis of economicalness factors and only secondarily from the viewpoint of compatibility with the outside world.

H. B.: The CEPT (Footnote: The videotex proposal worked out by the advisory body for the postal directorates of Western European Countries) is certainly more developed than the traditional Prestel (Footnote: The videotex display system first introduced in England). The CEPT has determining significance from the viewpoint of foreign contacts; one should not fail to use it.

E. P.: Prestel has been accepted and introduced in a number of places, but today we cannot consider it proper to choose this developmental direction.

J. G.: The experimental results are based on Prestel; unfortunately a public system on this base does not operate yet. The future belongs to the CEPT standard, but there must be cooperation between the Post Office and the enterprises dealing with videotex systems.

L. N.: It is unfortunate in general that we cannot choose a system in time. The Prestel level can certainly serve the needs of a large public, all the more so because it coincides with the display properties of the illustrated newspaper broadcast for several years. I see no general necessity for us to work together with foreign CEPT system videotex services. Access to special information is made possible by the gateway technique.

P. L. K.: The question is frequently posed in the form "CEPT or Prestel." Perhaps it would be better to talk about a simultaneous servicing of the CEPT and a base level standard. A base level standard does not have to be Prestel. The Antiope standard used in France offers a higher level than Prestel, it uses code expansion too, so, like the CEPT, it is open and can accept Latin and non-Latin based alphabets. In addition this standard is not hardware dependent. Like Prestel it can be run on most PCs without a problem.

A. K.: Software solutions do not always make PCs suitable for operation according to all videotex terminal standards. For example there are standards which are very hardware dependent and this ties realization to the existence of a display control VLSI. To what extent will this influence the operators of closed-circuit and public systems here?

L. N.: The VLSI solution has its elegance in fitting to a given standard. At the same time, even in such a hardware oriented solution one cannot do without an operating program.

J. G.: We need to create cheap devices, independent of personal computers too and serving only videotex purposes, with TV accessories. In this area we are still taking just the first steps.

P. L. K.: It will influence the operators of closed-circuit systems; for the most part they are acquiring the terminals themselves. The price level of the terminal is not a matter of indifference to them, and in a fundamental way the price level is determined by the standard.

A. K.: What is important in a videotex system, what applications must be regarded as basic?

J. G.: There is a need for transmission of color information which attracts attention. I feel that graphics must be given preference.

P. L. K.: Querying, message transmission, built-in and outside transactions are essential. Graphics and graphics based applications must be optional.

A. K.: There is also a problem in accessing international information in that the higher levels do not make possible full value display on cheap and medium priced printers. To what extent might all this influence acceptance of a domestic public videotex system?

P. Sz.: The higher presentation level, and the higher price that goes with it, certainly could have a bad influence on acceptance of a public system.

J. G.: The problem with printers may be a bit of a Hungarian speciality. This could derive from distrust in computer technology. We have not yet even suggested to videotex users that they should buy printers.

P. L. K.: There are no color printers in Hungary with which one could display information coded according to alphamosaic or especially alphageometric standards, for example for archiving purposes.

A. K.: To what extent will the well known and unfortunate deficiencies of the domestic telecommunications infrastructure hinder the spread of the videotex technology?

P. L. K.: It is an objective obstacle that in a quite large part of the country one links into the national telephone network with manual switching. These areas are excluded in advance from accessing the videotex service.

J. G.: The Hungarian Post Office has done much so there should be lines which can be used by computer technology. At the same time we can see that the development of the postal network is running into obstacles.

H. B.: Interpreting the infrastructure more broadly I consider fundamental from the viewpoint of the spread of a videotex service that we recognize the value of information, arouse a demand for information and, naturally, provide deliberate and reliable satisfaction of the demand. The neglect in this area may be greater than in the case of the telephone network.

A. K.: As of now the legal regulation of closed-circuit videotex systems, those not operated by the Post Office, is unsolved.

J. G.: Legal regulation will come to the fore in the case of public systems.

P. L. K.: It is time to create in addition to the telecommunications law a decree which is friendly to outside (e.g., closed-circuit) videotex users, thus which does not start simply from a rigid interpretation of the postal telecommunications monopoly.

E. P.: It is true that many things are not solved legally. I have a problem primarily with the postal monopoly. This goes beyond the problems with videotex. I consider it essential that the Post Office not hinder the forward movement of users where they cannot cooperate with their services.

A. K.: To what extent must the international practice influence us, Hungarians, from whom should we learn, what tools should we use in the interest of domestic success?

H. B.: We might learn essentially from England, France and the FRG. From France we should learn an incredibly well organized, concentrated, conceptual development. From England, in addition to studying the broad use possibilities, it is certain errors that might prove primarily instructive. From the FRG we should make use of a solution built on outside services--as a basic example--and we should make use of the whole network service concept deriving from this.

J. G.: Videotex has become a deficit operation in some countries; it is just beginning to develop in others. Things change depending on who has the videotex providing system in their hands.

P. L. K.: We must certainly pay attention to the experiences in France, to the business policy of the French post office and to the technical solutions used. At the moment their system is the only really successful large system, one operating at a profit, with nearly 1.5 million users.

E. P.: I feel that we must pay great attention to the international achievements. We will not discover any new and wise thing in this technology, but we must carry out an adaptation at a professional level.

From the Postal Videotex Bulletin

The Hungarian Post Office has provided a brief bulletin for a few potential users in the interest of preparing them for connection to a public videotex service. It appears from this that the provider of information can be one who, in accordance with an agreement with the Post Office, offers users information or transaction possibilities. The Post Office does not intend to make available to subscribers either storage space or processing capacity for data processing purposes on its own videotex computer. This function can be provided by outside computers. Every videotex terminal must meet basic requirements set by the Hungarian Post Office. The public postal videotex service will use the internationally standard CEPT alphamosaic and alphageometric display mode and will offer services for such terminals. The terminal types to be used in the experimental phase will be obtained by the Post Office together with the system, and it will make them available to some of the users.

The postal videotex service center will be in Budapest. The Post Office plans to install videotex call receiving units in several provincial cities as well. The units can be called for a uniform fee from the area, a fee more favorable than a long-distance call to Budapest.

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HUNGARIAN VIEW OF FUTURE OF ACTIVE MEMORY CARDS

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 20

[Interview with Tibor Ronai, chief of association coordination office, by H. B.: "The Active (?) Memory Card Company"]

[Text] The AMK GT (Active Memory Card Economic Association) was formed 2 years ago uniting 21 member enterprises. We asked Tibor Ronai, chief of the coordination office of the company embracing a broad spectrum of enterprises from the MNB [Hungarian National Bank] through the Hungarian Post Office to the SZAMALK [Computer Technology Applications Enterprise], about their goals and achievements.

[Question] Is it timely to deal with memory cards in Hungary?

[Answer] Uses for financial purposes represent perhaps the chief applications area for active memory cards. Unfortunately in our country neither credit cards nor payment by check have any special traditions, although very many factors, including a number of economic ones, urgently justify the introduction of instruments taking the place of money. The introduction of such instruments has been seriously considered here only since 1980. A study prepared in 1981 for the OMFB [National Technical Development Committee] called attention to the active memory cards, of French origin. In the course of debating the study the idea arose of bringing together in an association the manufacturers and users potentially interested in domestic uses of the cards. The first task of the association was to prepare a study in preparation for a decision; in it we summarized the applications possibilities and the conditions for concrete introduction.

[Question] What were the most important final conclusions of the study?

[Answer] Emphasizing that one should not forget about other types of cards in addition to the active memory cards the study stresses the broad use possibilities for active memory cards and argues unambiguously for their introduction. The sum of money stored in the card can be used immediately at time of payment. In addition to the greater security of stored information, not even comparable with other solutions, it is just this offline use which is especially important under the adverse telephone service conditions here. This

justifies our turning immediately to use of active memory cards in certain areas, bypassing various developmental phases.

The study distinguishes four chief applications groups: financial-commercial uses (an instrument for payment); medical uses (the cards could have an important role in both professional and general services); use as an identity document (e.g., in admission systems or for accreditation); and technical-industrial applications.

The quantity of information which can be stored in an active memory card is substantially greater (and is constantly increasing) than can be recorded on other types of cards (embossed cards or magnetic strip cards). This fact and the operations which can be performed with the stored data suggest the possibility of integrated applications.

[Question] What actual applications do you plan in the near future?

[Answer] We would like to try out a number of applications--let me emphasize, with an experimental character at first.

Use as a credit card is planned at the Skala Metro for about 10,000 regular customers--at first the cards will not be used in their entire range but only for identification purposes. The purpose of the project, probably using cards of French origin, is to strengthen and hold the circle of regular customers; of course, use of the cards will have an economic advantage. In the event of favorable experiences the Skala network will introduce use of the cards for all 64 of its members. Customers paying with the card will get an 8 percent discount, which means a not negligible advantage. We are urging the introduction of telephones using the card. By using them we might reduce the damage, now exceeding 10 million forints per year, from wrecking pay phones. The most common goal of the wrecking is to take the money in the phones, naturally there would be no money in the card phones.

There is also talk of medical use experiments, intially primarily in special services. For example, on the basis of data stored in the cards an artificial kidney machine could be set automatically to parameters suiting the current patient.

[Question] These are nice plans, but where will you get the cards for all this?

[Answer] In the beginning we can only rely on foreign shipments, but domestic manufacture is a precondition for broader introduction. As a first step we are thinking of domestic manufacture of so-called dispensable payment cards, with small value, which can be produced with simpler technology. These could be used, for example, in pay phones, parking meters, on the metro, etc. Certainly the domestic semiconducter and plastic industries are capable of organizing and solving manufacture of these. We are urging domestic card manufacture all the more because, for example, the Post Office will not begin experiments with card phones until a supply from a non-foreign-exchange source is assured.

[Question] How do you judge social acceptance of active memory cards in our country?

[Answer] I am optimistic. It is true that up to now we have not been a "card" nation, but we hope that the Skala experiment will have favorable experiences in this regard. Of course, acceptance and spread of the cards will be a long process. In any case, the experiences around the world speak for the active memory card.

This is why we are trying to build up our international contacts. We hope that in the near future our country will be a member of the international association, INTAMIC, the purpose of which is to exchange experiences and encourage standardization.

[Question] I thought the active memory card was already a standard; as I understand it they are planning to use tens of millions of them in France alone, for example. Is this true?

[Answer] It may be surprising but it is not entirely true yet. The main problem is differences of opinion about location of the contacts. For example, the French want one thing and the Japanese another. For the time being a compromise position has developed; at present the use of both solutions has been authorized. Until there is a final solution everyone is collecting arguments to defend the solution recommended by him.

[Question] How do you see the future of the association?

[Answer] I consider the beginning of experiments pertaining to practical uses most important from the viewpoint of both our present and our future. I know that the present narrow financial possibilities do not favor introduction of the card. But I am not pessimistic, if only because interest in the work of the association is growing; the number of member enterprises may soon reach 30 thanks to new entries.

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HUNGARY'S COMPUTER MARKET SURVEYED

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 pp 22-23

[Article by Gabor Hrotko: "The Hungarian Market: There Is Something..."]

[Text] The status of the domestic microcomputer market has changed substantially in the past one or two years. The general lack which could be felt in the area of both hardware and software has been replaced by a relative over-supply. This means that in general the supply satisfies, in many cases exceeds, demand, but at the same time satisfying a need different from the average runs into serious obstacles. Small undertakings have appeared on the market in large numbers. Their production and commercial activity is dynamic, they are sensitive to market changes and they are inclined toward innovation. The small undertakings are in sharp competition with each other and with state enterprises, and this led to a sudden drop in prices in 1986. The technical level of the products varies, but it is not low. It was surprising to find the appearance on domestic markets of 32 bit supermicros and machines equivalent to the Micro-VAX in addition to IBM PC and AT compatible machines. But it is alarming that almost 100 percent of the products were sold on the domestic market; they do not stand up on the capitalist market in regard to either price or technical level.

We can study the interdependencies of the status of microcomputer technology in more detail through the infrastructure of the microcomputer as a tool of production. By infrastructure we mean those social-economic factors which determine the social use of a tool, such as preparedness, manufacturing (or acquisition), service, education (training) and research and development.

Applications

During 1985-86 an opinion formed in applications practice that in regard to professional machines in the foreseeable future it is primarily the members of the IBM PC family (or compatible machines) which can be considered in typical use. The time of the general purpose 8 bit machines (and of the CP/M operating system) is slowly running out; other 16 bit machines (e.g., Macintosh) have practically dropped out of the competition, although a few users have not yet reckoned with the situation which has developed. So the fundamental question is that an applications development which has begun, which requires reorganization and software development in addition to acquisition of

hardware, should not be isolated from fellow systems and from the software products which will appear in the future.

For the sake of illustration let us take a district council which has decided for some reason to build its information system on the Macintosh, relatively rare here, or the Quadro (KFKI [Central Physics Research Institute]), with an uncertain future, despite the fact that the Capital Council recommends the IBM PC. Such a user misses out on the innumerable programs developed or to be developed for the IBM PC (the dumping of such programs can be expected soon), he gets into a dependent situation in regard to the vendor of the machine, but his biggest problem will be that it will be difficult to fit into a common council information system, which will develop sooner or later. Several years may pass before he sees his error, and can begin development from the beginning.

In our opinion the tyranny of the IBM PC family in a very large area of microcomputer applications is very advantageous from the viewpoint of users. When we say that the IBM PC has become an industry standard this must be interpreted not only in regard to hardware, because the standard character also appears in the area of system programs and applications programs. It is enough to refer here to the MS-DOS and XENIX operating systems or to the general market success of the LOTUS 1-2-3 and dBase applications programs. Every sign indicates that the larger software houses are developing more and more programs for members of the IBM PC family, primarily programs which can count on mass use. Preparation of Hungarian versions of the programs important for applications here represents an extraordinary task for dometic developers since these will be used primarily in office systems where perfect Hungarian orthography is an indispensable condition.

There are a few areas in domestic applications in the judgment of which, in our opinion, there is need for a fundamental change. We are talking about certain commercial, warehouse, bookkeeping and savings bank applications where electromechanical machines operate today (cash resgisters, adding machines) or where they still use human manpower (e.g., to inventory, arrange and process libraries, warehouses and other stockpiles).

It is characteristic of these applications areas that a large part of the activity could be automated with relatively simple, standardized hardware and software solutions and that the user is entirely inexpert in regard to computer technology. What is obvious for this is use of very user friendly, cheap microcomputers which can be manufactured in medium size series and which contain burned-in software. We expect such a microcomputer to be simply made and to have an electric typewriter (which can handle the Hungarian alphabet) and a picture screen display for data input and output. For inventory processing and cashier applications there is also need for a line code reader, which can be connected directly to the microcomputer or dismountable (combined with a data collecting micro-peripheral, offline).

Software

The development of burned-in software deserves special attention. It should be self-explanatory (in the Hungarian language, naturally), should help the lay user in every possible situation (the Help function), should have a tree

structure menu command set and should make use of the microcomputer entirely natural in the given environment.

According to our estimates there is a need for at least 100,000 such simply made and simple to operate microcomputers in commerce, industry, savings banks, insurance offices and other places; the more expensive, more complicated IBM PC family requiring a higher user culture is not needed here.

In any case, in regard to applications, presuming a given hardware level, the situation is defined by software supply and the receptivity of users. The development of user friendly software could be solved technically today, because the technical level (human expert and machine) is already satisfactory, but the cooperation between developers and users--which is a precondition for good software quality--is not satisfactory for the time being because of the low level of user culture.

The receptitivity of users and their readiness to cooperate (the development of the user culture) depend on several factors and this is a complicated social-economic question. Among the factors the most important is an economic constraint to use microcomputer technology. Behind this stand such questions as the developmental level of the economy (in regard to technology and organization), the organizational level of the state apparatus, commerce and other institutions and their demand for the introduction of automated information systems, the performance/price relationship of such systems compared to the similar parameters of manual information systems, the effectiveness of informatics education, etc.

With great probability we can say of all the factors listed that their trend encourages the use of microcomputer technology. This statement comes from the observation that in our country the manufacture and sale of microcomputers has increased significantly recently and that investments in microcomputers (despite the well known investment restrictions) have increased significantly both in enterprises and in the state apparatus. In the past half year the performance/price ratio has increased 2-3 times (e.g., in the IBM PC/XT category), due to the fall in prices, so the use of microcomputers has become attractive.

Manufacturing, Acquisition, Trade

Appearing as a determining factor today in the creation of the microcomputer supply (thus in the areas of manufacture, acquisition and trade) is the socialist small undertaking, which has become one of the engines of the domestic development of microcomputer technology. The small undertakings (the designation "small" is only legally valid for some, their annual turnover can be several hundred million forints) are working primarily with Far Eastern "technology" which means assembly and testing primarily from import parts and semifinished products. Their products include IBM PC/XT and /AT compatible machines, networks, 32 bit supermicros, machines corresponding to the Micro-VAX and applications and system programs. The small undertakings sell the products, service them, manufacture applications programs and even undertake to train operators or set up operations. Some of them (e.g., Instrument Technology and Rolitron) also sell products they developed themselves while others only sell imported finished products.

This latter activity, however, belongs primarily in the sphere of deals with foreign trade enterprises at the other end of the scale which creates the supply (e.g., Migert, Metrimpex or Elektromodul) and commercial enterprises (e.g., Novotrade or Skala). These firms play a significant role in price competition; for example, Novotrade started the fall in prices by importing a large number of Commodore PC-20 machines. (At present the price of a fully configured IBM PC/XT compatible microcomputer is about 500,000 forints; an AT compatible microcomputer costs about 1 million forints; the price of an original IBM product is about twice as high.)

The original facilities for Hungarian computer technology--Videoton, the KFKI [Central Physics Research Institute], the SZKI [Computer Technology Research Institute and Innovation Center], SZAMALK [Computer Technology Applications Enterprise] and the SZTAKI [Computer Technology and Automation Research Institute]--are not in the vanguard in producing the supply.

Each of them is going its own way, although in the past year some uncertainty was felt in their developmental and commercial strategies. Videoton manufactures primarily for the CEMA market and does not play a significant role in domestic microcomputer technology. The KFKI and SZAMALK came out this year with a MIcro-VAX development, which is certainly a noteworthy ahievement. The SZKI and SZTAKI-COSY are manufacturing XT and AT compatible microcomputers in small series. The SZKI assortment is extensive (it is enough to page through their catalog), and this encourages a further strengthening of market competition. SZTAKI-COSY is counting on a market primarily in academic circles, but it is eyeing other sectors too.

In any case, vigorous advertising and marketing activity is taking place on the market, which is certainly a new phenomenon in the sale of machine industry products. The manufacturers are trying to place their products in the various branches of the economy, looking for opportunities in the present narrow investment situation. At present their offerings consist primarily of computers, system programs and business-financial programs; the development of complex applications systems will become a subject for domestic contracts only with a general spread of user culture.

At present and in the foreseeable future the narrowness of the market will be one of the determining factors for our microcomputer manufacture. According to an objective calculation we have no chance of re-exporting to the capitalist market, or to customers paying with convertible exchange, microcomputers assembled from parts and semifinished products obtained for foreign exchange. And it is hard to "break into" the CEMA markets partly because of the quotas and the rigid price system and partly because it is not worth it to export to markets paying with such money products containing "hard" foreign exchange (indeed, there are restrictions on it). The situation is different in regard to software products, but for the time being neither the software manufacturers nor foreign trade are studying this possibility seriously.

Marketing and Sales Services

As long as microcomputer technology counted as a shortage item the principle followed in this area also was "eat it or leave it." Unfortunately shortages

are still a market factor so some of the vendors are still selling bare computers and bare or foreign (in language and function) programs, not much concerned with the needs of domestic users. Some of the importers are not researching the market, do not advertise, only bring them in and sell at dumping prices. Information spreads by word of mouth.

But we have found thought out advertising activity from some small undertakings (e.g., Instrument Technology, Rolitron and Microsystem) and enterprises (e.g., the SZKI and SZAMALK). These firms conduct complex activity, have active contact with users, follow their needs, issue catalogs and price lists, improve the quality of product documentation, train the users and undertake to service the hardware and follow up the software sold. As a result of this activity the product is no longer a pig in a poke as it was 2-3 years ago. The question today turns not around "what" but rather around "what sort." For example, how reliable is a microcomputer, can it handle a text editing program in Hungarian, a keyboard, a picture screen and a printer, how compatible is the "compatible" machine? Which IBM programs run on it and which do not? What sort of parts supply and service does it have? What happens if the vendor suddenly disappears from the market?

Is the purchaser capable of seeing through these questions, capable of deciding which product information is credible and which is less so? Can he handle the delicate questions legally in the sales contract and in other forms?

We feel an increasing need for information to come not only from the vendors, for an independent organization to protect the interests of users from vendors, an organization which would test the machines and programs and make the results public.

Education, Training

There is finally an awareness at the social level that effective education is one of the most important preconditions for creating a microcomputer user culture. This is why they started the TV-BASIC course, the microcomputer technology club movement, a number of generally effective state and private courses and the teaching of programming in schools. The recently developed self-explanatory programs have brought perhaps the most effective form of education and training.

Although we can be justly proud of organizing to provide schools with microcomputers we must now regard this as a necessary but not sufficient factor, as a quantitative condition. Two important questions arise regarding the quality of education:

Has an educational methodology been worked out for programming and using microcomputers? and

Are teachers available who are capable of using such a methodology?

It is to be feared that at present it is difficult to give an affirmative answer to these questions although the lack of the conditions formulated here

could mean that the schools which teach programming without applications tasks will regard microcomputers as useless or at most as toys.

On-the-job training appears to be substantially more effective today than organized education. This training can be done in a flexible system, can be adjusted to the needs of the given user and, what is equally important, it is a question which can be handled as an economic transaction between vendor and user, the success of which is in the interest of both parties. We see in this latter factor the basic difference between on-the-job training and organized education, naturally to the benefit of the former.

Research and Development

On the basis of recent trends it can be said that we are finally beginning to give up unique hardware developments. In principle these could be shining accomplishments, but in practice, lacking a technological base, they usually resulted in mongrels. Today hardware development means primarily the development of assembly-testing technology for semifinished products, and the configuring of systems made from semifinished products. It is a virtual absurdity to speak of scientific research in this area, and if such is taking place somewhere it is with great probability throwing money away.

The situation is different in the area of software where we could have achievements even greater than at present, as is shown by the development of PROLOG variants or the survival in Hungary of CDL 2 for example. We should not begrudge the money and other support for the further development of established software schools, for acquisition of the more powerful tools needed and for the concentration of forces (which succeeded in the case of PROLOG). We should strive to produce marketable finished products as a result of software developments, similar to MPROLOG. But we must see that our scientific software shops are not getting stressed material or moral support from either enterprises or the Hungarian Academy of Sciences, so it is to be feared that their products may simply disappear in the avalanche of foreign competition. It may be that they will be right, those who disparage the volume of our software research and development achievements, saying, "Balazs makes more at one tennis match."

A few words must be said about a unique form of hardware development, which we might call the configuring of systems. This means that the developer produces systems suiting user needs out of finished or semifinished products, with his own program development, for a single order or for production in a small series.

Service

As with applications it is difficult to survey the service situation. We do not have precise data on service prices or service speed and quality. It is perhaps in regard to service that the user is most at the mercy of others. It is most advantageous for him if he signs a service contract with the vendor at the time of purchase, for in a saturated market the customer is in a position to dictate the terms at time of purchase. At such a time not only can he set fair service fees but also the frequency of maintenance and the urgency of repairs. If he cannot sign a service contract with the vendor the annual service costs for a PC/XT can come to as much as 50,000 forints. Entrepreneurs

note especially that the risk is great because of the vulnerability of the Winchester disk.

As we mentioned, it also represents a serious risk for the user that if the vendor is a small undertaking it can go bankrupt and disappear from the market due to competition. An entrepreneur may still offer service, but the costs will be very high.

Implications

The period 1985-86 can be evaluated positively not only from the viewpoint that manufacture and sale of microcomputers developed swiftly in both quantity and quality but also from the viewpoint that the expertise and practical experience of our specialists was modernized to a certain degree (especially in regard to assembly, testing and service technology). It may be that the tyranny of the IBM PC's, their becoming the industry standard, embitters those whose creative imagination thinks differently but the situation which has developed makes it possible for us to finally turn our energies to qualitative questions of using microcomputers, because this is the area where we must make progress in the second half of the 1980's.

It is an important implication that the situation has matured, from both applications and technological viewpoints, for series manufacture of simple microcomputers serving commercial-financial applications and for the development of Hungarian language, user friendly programs for them. Because of the larger volume one can even imagine the creation of joint enterprises for this purpose.

Without a further advance of flexible (small) undertakings one cannot imagine a successful future for domestic microcomputer technology. These undertakings can encourage progress not only in manufacture and trade but also in areas where serious backwardness appears today such as service, education and training and the development of user friendly programs.

Today, when a good hardware supply is chiefly characteristic, the most important task is the development of user culture and the development of user friendly systems. These are qualitative requirements and meeting them requires the coordinated work of science and the profession, and the active participation and receptivity of state administration, the economy and industry. Questions of the first order within this are development, adaptation and spread of efficient methods for designing applications systems and the manufacture of applications programs which are capable of developing the microcomputer into an organic part of the given user environment.

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TAIWANESE PRODUCTS TEMPT HUNGARIAN IMPORTER

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 25

[Article by J. A. V.: "Far East Fable"]

[Text] Gabor Iklody, director general of Elektromodul, traveled to the Far East in an arrangement with the Chamber of Commerce. Although the Near East is the land of fables the vice president of the Electrotechnology Branch of the Chamber must have rubbed his eyes more than once to see whether he was dreaming.

There was a fair in Taipei, the capital of Taiwan. The mood of the Arab or Turkish bazaar is called fabulous, but what is this compared to the charm of technology, of electronics. There was not stand of 10 square meters where they did not use a computer, for quality control if nothing else. The subject of the exhibit was not computer technology; the delegates of the Chamber could look at everything from small motor manufacture to telephone assembly, but the director general of the EMO [Elektromodul] could see that there all this is unamiginable without computers.

The guests got information along with the spicy Chinese food. For example, that in 1985 they made 4,700,000 computers in Taiwan. The central and eastern European visitors could not help but wonder. And if their mouths dropped open trying to believe what was said they could visit the Taiwan "Silicon Valley", the endless line of specialized factory halls. In one they make only keyboards, in another thousands of monitors. And then someone asked the director general of the EMO: "Would you like to take home a few IBM PC/AT compatible machines?"

We will cut the deal short; at the end of the bargaining they settled at 2,100 dollars.

"I didn't have the heart to leave it at that, I had to buy a few kits, enough for 100 complete configurations," Gabor Iklody said.

It should be added that the EMO is a parts importer; it can make such purchases only with so-called additional export returns. Then and there, at those prices, this came to 100 computers.

There is a 1 M byte central unit, a 20 M byte hard disk, a 1.2 M byte floppy and a color graphics display. The EMO has decided that the domestic price for the basic configuration is 182,000 forints.

A fabulous price. The list of registrants grew to thousands in moments; one customer ordered 600 of them, another modestly wanted only one. One customer got a computer in act one and now proves in a virtual dissertation that he must have another 46. The director general cannot hide that he is moved; he himself did not believe that each machine sold would become so effective so quickly, that the machines would rouse further thoughts, that the EMO AT's could play the role of catalyst in positive processes.

Indeed. The purchase, the price and the example did become catalysts. We do not know if the July resolution of the GB [Economic Committee] was born in the spirit of the EMO import or if the EMO knew, even at the beginning of the year, the spirit of the GB resolution on domestic manufacture and import of PPC category machines, in any case the coincidence is striking. The EMO imagines the continuation in the association asked for by the chief authorities; the requirements of the resolution (complete compatibility with IBM computers and realistic, let us say Western European, prices) have been met already. Import of the second hundred will be essentially simple machine acquisition; by ordering a various assortment of elements Elektromodul would like to gradually switch to domestic assembly and some of the manufacture. The Taiwan exporter will help in this too; his service documentation is also worthy of a fable.

This is the fable so far. One hundred and another hundred cheap AT's have let the genie out of the bottle. Now this genie must perform a miracle so that the many thousand registrants at the EMO can get their machines within a foreseeable time and the official ticking off the names can give a sigh of relief, "That's the end, fly away!"

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HUNGARIAN NATIONAL SCIENTIFIC RESEARCH FUND GRANTS LISTED

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 31

[Text] The National Scientific Research Fund (OTKA) was established by the Science Policy Committee of the Council of Ministers to give increased support to basic research beginning in 1986. The sum for the fund during the Seventh 5-Year Plan is 3.8-4 billion forints, half of which can be turned to current costs and half to development of the research infrastructure and acquisition of instruments and computer devices. On the basis of the decision of the OTKA committee 761 themes out of the 1,926 entries have received support. We publish below the winning themes in the categories of computer science, software and hardware development and computer applications. (The sums pertain to the costs of research; the institutions will get separate support for instrument and computer technology investments, on the basis of a later decision.) The names are those of the theme leaders.

1. Dr Vladimir Szekely, 1,000,000 forints, Electronic Devices Faculty, BME [Budapest Technical University]: A graphics designing system supporting microelectronics designing.

2. Endre Selenyi, 1,390,000 forints, Instruments and Measurement Technology Faculty, BME: Error diagnostics for informatics systems.

3. Gabor Peceli, 600,000 forints, Instruments and Measurement Technology Faculty, BME: Systems technology for intelligent measurement systems supporting solution of complex measurement technology tasks.

4. Zoltan Benyo, 2,400,000 forints, Process Control Faculty, BME: Computer simulation of biological processes and regulators and analysis with multivariable statistical methods.

5. Robert Tuchak, 6,950,000 forints, Automation Faculty, BME: Modern trends in control technology.

6. Dr Laszlo Varga, 4,270,000 forints, Mechanical Engineering School, Machine Tectonics Institute, BME: Modeling and computer simulation of mechanical structures and structural connections changing under load.

7. Peter Arato, 2,710,000 forints, Process Control Faculty, BME: Operational description, design and testing of digital control units on the basis of prescribed input and output variables.

8. Istvan Kollar, 700,000 forints, Instruments and Measurement Technology Faculty, BME: A study of the performance capability of intelligent signal processing procedures and signal processing tools.

9. Dr Tamas Legendi, 3,900,000 forints, Faculty Research Group for Automatic Theory, MTA [Hungarian Academy of Sciences]: A study of cell automats, design of cell algorithms, architectural research, microelectronic design methodological research on high speed, local data traffic, homogeneous V/LSI, WSI circuits and cell processors and programming systems based on them.

10. Laszlo Monostori, 2,500,000 forints, MTA SZTAKI [Computer Technology and Automation Research Institute of the MTA]: Research laying the foundations for automatic supervision and diagnostics of machine tools and manufacturing systems.

11. Tibor Vamos, 4,290,000 forints, MTA SZTAKI: Expert systems, methods and practice.

12. Tamas Varady, 3,260,000 forints, MTA SZTAKI: Mathematical, computer technology and computer graphics questions of modeling bodies defined by free form surfaces.

13. Imre Abos, 1,600,000 forints, MTA SZTAKI: Research on algorithms solving model classes of problems reducible to linkages of geometric forms placed on parallel planes in a prescribed manner.

14. Laszlo Csaba, 7,400,000 forints, MTA SZTAKI: Research on the system technology and communications foundations of new generation information networks, control of resources of distributed systems.

15. Dmitrij Csetverikov, 600,000 forints, MTA SZTAKI: Development of new methods of digital image analysis.

16. Janos Foglein, 1,420,000 forints, MTA SZTAKI: Use of computerized image processing in a study of macro and micromorphological characteristics used in animal husbandry, development of methodology.

17. Jozsef Hatvany, 5,216,000 forints, MTA SZTAKI: Basic research on development of scientific tools for intelligent systems suitable for solving technical problems.

18. Elod Knuth, 6,740,000 forints, MTA SZTAKI: Intelligent devices for information systems.

19. Andras Nemeth, 3,900,000 forints, Science Organization and Informatics Institute: A systems theory study of the interaction of tools and content in higher education on a model of chemical engineering education.

20. Laszlo Gyorfi, 1,850,000 forints, Informatics Electronics Faculty Research Group of the MTA: Packing and coding signals with structural restrictions useful in new trends of telecommunications and telematic mass services.

21. Dr Geza Gordos, 4,133,000 forints, BME Communications Engineering Electronics Institute: Computer speech recognition at the acoustic-phonetic level.

22. Laszlo Szabo, 13,900,000 forints, Particle and Nuclear Physics Research, MTA KFKI [Central Physics Research Institute of the MTA]: Development of highly reliable, highly complex electronic devices for aerospace purposes.

23. Lajos Rozsa, 900,000 forints, MTA SZTAKI: New directions in the man-machine link of process control systems. Subtheme: Systems technology questions of using a synthesized human voice.

24. Geza Lorincze, 3,900,000 forints, MTA KFKI: Research and development on high performance, serially linked, parallel architectures primarily for real time scientific-technical applications requiring much computation and precision.

25. Matyas Arato, 2,200,000 forints, Mathematics Institute, KLTE [Lajos Kossuth Science University], TTK: Development of an enterprise guidance and decision system independent of the control system, supported by computer technology.

26. Dr Kalman Gyory, 1,085,000 forints, Algebra and Number Theory Faculty, KLTE: Development of algorithms to solve diophantic problems and preparation of computer procedures to determine total solutions.

27. Andras Benczur, 2,000,000 forints, ELTE [Lorand Eotvos Science University] Computer Center: Mathematical foundations of information systems; possibilities of measuring the information used in systems, interrelationships of quantity characteristics, complexity characteristics and efficiency.

28. Dr Margit Kovacs, 2,200,000 forints, ELTE Computer Center: A study of mathematical models having uncertain information with the tools of non-linear analysis and probability theory.

29. Dr Istvan Maros, 3,240,000 forints, MTA SZTAKI: Development of intelligent mathematical programming systems and new linear programming techniques, a theoretical and computer technology study of nonlinear programming procedures based on them.

30. Dr Andras Prekopa, 5,400,000 forints, MTA SZTAKI: Optimization of large scale stochastic systems, optimization problems of electric power systems.

31. Janos Demetrovics, 9,400,000 forints, MTA SZTAKI: A study of data models and data structures with mathematical tools.

32. Laszlo Gerencser, 800,000 forints, MTA SZTAKI: Stochastic analysis computer methods.

33. Arpad Makay, 1,440,000 forints, JATE [Attila Jozsef Science University] Computer Technology Faculty: Research on form recognition and translation models based on attribute grammars.

34. Zoltan Esik, 1,475,000 forints, JATE Computer Science Faculty: A structural study of automatic devices.

35. Miklos Szijarto, 700,000 forints, Transportation and Telecommunications Technical College: Formal languages and programming theory.

36. Imre Csiszar, 1,450,000 forints, MTA Mathematics Research Institute: Information theory basic research with special regard to communications and computer science applications and applications within mathematics.

37. Istvan Nemeth, 3,200,000 forints, MTA Mathematics Research Institute: Mathematical foundations of the semantics oriented parts of computer science and algebraic logic.

38. Laszlo Lovasz, 4,900,000 forints, ELTE TTK Computer Science Faculty: Asymptotic analysis of algorithms.

39. Tibor Kovacs, 2,700,000 forints, Hungarian National Museum: Analysis and recording archeological sites with a computer.

40. Dr Csaba Szekely, 1,000,000 forints, Operations Faculty, Godollo Agricultural Sciences University: Development of planning and internal guidance at agricultural enterprises using computer technology.

41. Dr Gyorgy Varallyay, 5,400,000 forints, MTA Soil Science and Agrochemical Research Institute: Further development of a soil information system.

42. Gyorgy Radvanyi, 1,000,000 forints, BME Architectural Engineering School: The world of architecture and the interpretation of elements of design space in a computer aided environment.

43. Balint Petro, 2,505,000 forints, BME Architectural Structure and Equipment Institute, Tectonics Faculty: General and specific use of design technologies in the area of architectural tectonics.

44. Dr Lajos Papp, 501,000 forints, KLTE Inorganic and Analytical Chemistry Faculty: Development of an inductive connected argon plasma ray source and multichannel emission spectrometer with a computer controlled data collection and processing system--primarily for agricultural (soil, plant) studies.

45. Dr Jozsef Reffy, 705,000 forints, BME Inorganic Chemistry Faculty: A study of silicon organic molecules and chemical reactions with the aid of a quantum chemistry program system running on a microcomputer and UPS measurements.

46. Ferenc Nagy, 1,500,000 forints, ELTE Inorganic and Analytical Chemistry Faculty: Building distributed intelligence nets based on an IBM PC compatible central computer and a general purpose microcomputer environment and use of

these to control instruments in analytical chemistry laboratories and to collect and process data.

47. Dr Tibor Toth, 1,945,000 forints, ELTE Chemical Technology Faculty: Development of online computer environmental protection analytical method packages.

48. Ferenc Gaizer, 500,000 forints, JATE Inorganic and Analytical Chemistry Faculty: A study of complicated complex equilibria in solvents and development of computerized evaluation procedures.

49. Pal Benedek, 1,000,000 forints, ELTE Natural Sciences School, Chemical Cybernetics Laboratory: Use of artifical intelligence in chemical sciences with special regard to reaction kinetics.

50. Dr Imre Ruff, 300,000 forints, ELTE Theoretical Chemistry Laboratory: Computer simulation of fluids and other unorganized systems and a statistical geometric interpretation of their structure.

51. Dr Miklos Rajczy, 1,000,000 forints, Natural Sciences Museum Botanical Collection: Organization of the botanical collections of the Botanical Collection of the Hungarian Natural Sciences Museum into a computer databank, phase 1.

52. Dr Denes Janossy, 800,000 forints, Hungarian Ornithology Association: A computer record system and biometric analysis of bird flight data.

53. Dr Tamas Katona, 2,900,000 forints, State Census Office: Development of a complex information system laying the foundations for the development of the social sciences and public administration on the basis of an integrated information system for census, popular movement and population records.

54. Dr Jozsef Voros, 200,000 forints, JPTE School of Economics Science: Operations research models for enterprise planning.

55. Imre Kovach, 1,000,000 forints, Social Research Informatics Association: Computer processing and secondary analysis of data in statistical publications.

56. Attila Chikan, 1,000,000 forints, MKKE [Karl Marx University of Economic Sciences]: Domestic application of integrated production-stockpiling systems.

57. Mihaly Simai, 5,700,000 forints, MTA World Economy Research Institute: Chief global and regional trends of technical-scientific development, their effect on world economic and international political relationships and on the economic and science policies of states in the last period of the 20th century.

58. Imre Tarafas, 1,000,000 forints, National Plan Office: Rate of exchange prognosis--with a computer.

59. Dr Sandor Balazs, 1,000,000 forints, National Technical Information Center and Library: Development of enterprise information systems with special regard to leader decision making and R and D information.

60. Dr Jozsef Kupcsik, 1,200,000 forints, MKKE Statistics Faculty: Research and development on modern statistical methods aiding economic analysis, planning and guidance.

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HUNGARIAN, SOVIET SCIENCE AND TECHNOLOGY COOPERATION

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 3, Nov 86 p 32

[Unsigned article: "Outstanding 'Contacts'"]

[Text] As everyone should know the exhibits held at the Soviet Science and Culture House have--beyond their substantive interest--generally symbolic value as well. One way or another each demonstrates cooperation, closeness and contacts. Without meaning to put other programs in the balance in the columns of this journal the September exhibit titled "Automation in Informatics" deserves first place virtually sight unseen, at least in regard to the precision and visibility of the symbol. Can anything symbolize the contacts more strikingly than computer networks several thousand kilometers long? Can anything characterize the closeness more effectively than the fact that the Estonian Academy of Sciences and Videoton, "overcoming the distance between them," are aiming at a transmission speed of 1 M bits per second and will soon develop a local net linked with optical cable which will mean a new order of magnitude in transmission speed? Can anything express the cooperation in a more modern way than the computer aided exchange of technical, scientific information, or the joint development of teledata processing systems suitable for information exchange?

Of course the exhibit does not just symbolize the cooperation; in its content also it speaks of the results thus far of a cooperation agreement, permitting a glance into the process of realization. We asked Karoly Stuka (OMFB [National Technical Development Committee]), organizer of the exhibit, what position the 1982 agreement, adopted in the interest of "creating computer networks and teledata processing systems," ccupies in the system of agreements.

"The agreement is between the Scientific and Technical State Committee of the Soviet Union and the OMFB and the MTA [Hungarian Academy of Sciences]. A bilateral intergovernment committee regularly reviews the achievements and the agreement gets special treatment in both countries. Naturally the cooperation did not begin in 1982 but rather much longer ago. The goal was to harmonize the already existing developments and to create closer contacts among developers and users."

(Rambling around the exhibit it would be hard to get a picture of the momentary level of the fulfillment of the joint tasks outlined in the agreement for in the case of the Hungarian participants in the cooperation (Terta, Videoton, SZTAKI [Computer Technology and Automation Research Institute], OMIKK [National Technical Information Center and Library], SZKI [Computer Technology Research Institute and Innovation Center], VEIKI [Electric Power Industry Research Institute], Orion, SZAMALK [Computer Technology Applications Enterprise] and the BME [Budapest Technical University] HI) what is new is not the devices displayed but rather the system to which they are connected or what runs on it. Our "tour guide", Karoly Stuka, is ready to orient us.)

"Among the themes shown at the exhibit I list in the first group those where Hungarian developers, cooperating with Soviet users, have developed systems precisely covering the needs of the users."

"We might call this a sort of entrepreneurial contract, no? The Hungarian developer delivers on an order from a Soviet user...."

"Only here the need of the purchaser--and the product of the developer--is the result of a several years iterative process. This is why we list this theme within a framework of cooperation. Naturally this area resembles an entrepreneurial market to the extent that we are in strong competition with Soviet, socialist and even capitalist manufacturers, and the product must be able to do something which the equipment manufactured in large series cannot do. The most significant user in this area is the fuel-energetics complex, for which Terta, Videoton and the SZTAKI have delivered systems and equipment, and now Orion has joined in the cooperation. The image processing, image forwarding devices of the SZKI have a significant role in the joint development of agricultural systems. And since I am showing a journalist around let me mention the TASS correspondents' work station which combines a VT-16 editing terminal and a VDN-52586 telex terminal to provide a procedure to call a telex line, editing of textual information, transmission and reception."

"Maybe we should take a break here, for now we are at the title of the exhibit--Automation in Informatics."

"I would just as soon go on to the other great area of the cooperation, because 'computer aided exchange of technical-scientific information' coincides with the title no less. Within the framework of the cited agreement the domestic firms (primarily the OMIKK and the VEIKI) are doing system development; another agreement pertains to the exchange of information itself. At present we can access nearly 50 Soviet databases through the VNIIPAS institute, and we also offer a few databases to Soviet users. The third area of cooperation is scientific research, joint development, and in this area also we have achievements at the world level. In teledata processing we model networks with a computer, we jointly design programs which require large systems (SZAMALK, SZTAKI), and recently, in the local network theme, the network developed by the Estonian Academic Institute and Videoton for process control purposes is significant."

"The agreement dates from 1982. The signatories have extended it to 1990. Is this not too long range in an area where new devices appear day after day and a technological novelty, a hardware or software development, can re-order the priorities?"

"The agreement is open, we correct the work program each year. Together with the Soviet side we are ready to examine every proposal which serves the further development of cooperation. But computer networks and remote data processing--as themes--will, I believe, not become obsolete for a while. And if good network systems are to be born, if good contacts are to develop between computers, there must be good contacts between the researchers and developers of the two countries too."

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HUNGARIAN PROGRAMMERS FIND LUCRATIVE WORK ABROAD

Budapest FIGYELO in Hungarian No 47, 20 Nov 86 p 6

[Article by Gitta Takacs: "A Programmer's Point of View"]

[Text] According to information received from the Labor Affairs Information Center 385 Hungarian computer technicians worked abroad in the second half of 1985, 232 of them within the framework of a foreign trade contract and 153 having contracted as individual employees. The majority worked in the German language area--Austria and the FRG--but they also worked in India, Australia and Kuwait.

In general these data are received sceptically in computer technician circles; it is estimated that the number actually working abroad is two or three times greater than this. The official statistics hide programmers working abroad as consultants, instructors, technicians, mathematicians or under some other designation, and frequently designations similar to this are more advantageous for foreign employers because of the restrictions there pertaining to hiring foreign workers.

Price Wars

Why does a Hungarian computer program designer happily undertake work abroad? The question may appear naive knowing that compared to the 30-50 forint (!) hourly wage of a domestic enterprise or the 200-300 forint (!) hourly wage which can be earned in a small undertaking their work is valued at 50-100 West German marks (!!) per hour in an industrially developed country. In addition, how much they pay in other countries for the work of a software expert depends not only on the abilities of the employee in question, his professional and language knowledge, but also on who sends him, where, and for what work, on which of our foreign trade firms handled the business, and perhaps on which foreign agent, often of debatable professional competence, wandering through Hungary looking for experts at a cheap price, handled the business. The contacts are labyrinthine and often the foreign employer comes out the winner from the "matches" for business taking place among Hungarian foreign trade enterprises competing with one another--working with different profit margins, calculation bases and market strategies; the foreign employer gets a good brain at "half price."

Most of the experts work abroad out of the SZKI [Computer Technology Research Institute and Innovation Center] and SZAMALK [Computer Technology Applications Enterprise], but more and more people are offering their intellectual capacities as GMK [economic work association] or small cooperative members--not infrequently leaving the large software houses as a group.

According to expert opinions, if the foreign trade enterprise would not simply sell the knowledge of a programmer for hourly wages but rather would undertake complex task solution then they could get 40-50 percent more foreign exchange out of the deals. Of course then they would not only have to administer the expert transfer but also actually perform an undertaking, put together teams, harmonize the interests of subcontractors and organize the work, and all this requires computer technology expertise and a good knowledge of the software market of the given Western country. All this depends not only on the foreign trade enterprises but also on the lack of interest in this or even on the contrary interests of the employers and of the domestic computer technology enterprises.

Not Only for the Pay

A Hungarian computer technician goes abroad not only for pay 10-20 times the pay here at home, not only to earn foreign exchange, but also because, as one of them said, the hardware there, the computer, is like "central heating," one does not have to worry how to "fuel" the system. The programmer has enough to think about, the algorithm for the task to be solved, writing the computer program, and does not constantly have to worry, as in the majority of domestic computer centers, when a new failure of the magnetic disk is "due", which could destroy or "take away" two week's work, whether the imagined solution will fit into the central memory of the computer, etc.

Our domestic computer inventory is old and obsolete; the larger machines are used up to the upper limit of their physical capacity; one third of them have been written off to zero (!). Working on the equipment is not an outstanding professional task for a well trained programmer.

The frequently voiced view--not in computer technology circles--according to which all one needs to write software is paper, pencil and a good head is a gross error. One also needs not only modern hardware but also the know-how--development programs, technologies, methodologies--aiding the writing of software.

The programmers working abroad earn much more than their colleagues here at home because they can work in a substantially better machine environment, can get at modern tools and methods several years sooner.

Each year the convertible exchange software export of our country grows by 30-40 percent; the foreign exchange income deriving from this approached 8 million dollars in 1985--with a very good yield index (FIGYELO, No 6, 1986). The profit brought by one or two of our software engineers who have had international careers--for example, the PROLOG systems of the SZKI and the CAD programs of the Graphisoft GMK--represents at most a few percent in the imposing increase. The rest of the increase in income--thanks to the software industry boom of recent years--comes from the work of the programmers working

abroad in ever increasing numbers. A number of conditions are lacking for the production here at home of software products which could also be sold for foreign exchange. Need we list modern hardware, capital investment (in dollars too), market research, advertising, a sales network, good domestic references? Ever longer missions abroad are a much more advantageous--and practically risk free--source of income for both foreign trade enterprises and programmers.

Looking At It Realistically

What might be a realistic judgment of this trend? Let us quote from an article by Jozsef Szabo and Istvan Dienes titled "Thoughts and Ideas About the Hungarian Information Economy" (KOZGAZDASAGI SZEMLE, No 7-8, 1985):

"... In leading countries with a developed structure the high productivity achieved earlier in developed branches makes it possible to transfer manpower, in large numbers and quickly, to a new, developing branch.... The backward countries are still in only the first or second phase of developing the branches which were the driving ones earlier. In this phase the backward countries can export manpower which can be employed in the newly developing branches in developed countries, manpower for which there is not yet real demand at home, under advantageous conditions. (At least the conditions are advantageous for the exported manpower and for the importing country.) Such was the case with the Central European and European emigration at the time of the upswing in the industry of the United States and now with the brain drain or the new export of computer programmers."

There is great demand for computer technicians on the Hungarian manpower market. It is enough to leaf through the help wanted pages of some newspaper or listen to the cadre problems of those organizing a computer center. But the "trade value" of the experts does not even approach the income which can be attained by taking work abroad. There are strong motives for our software export.

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HUNGARIAN EXPERT SEES COMPUTER LAG DIMINISHING IN CASE OF PC'S

Budapest MAGYAR NEMZET in Hungarian 14 Nov 86 p 5

[Interview with Dr Peter Vadasz, of the Janos Neumann Computer Sciences Society, by Peter Szauer: "How Much Does a Computer Technican Earn? Where Backwardness Is Not Necessary"]

[Text] Most experts agree that the computer technology industry of Hungary is at least a decade behind compared to the level of the most developed capitalist countries. But perhaps there is an area where we still have a place, where the lag is not so great, and can be decreased still further! We are talking about the professional personal computers, the PC's.

Prices and Order
The Janos Neumann Computer Sciences Society is holding its third national congress on their use under the title "Applications '86." The title of the paper by Dr Peter Vadasz, chairman of the systems organization and informatics department of the society and chief engineer of the Microsystem Computer Technology Small Cooperative, is "PC Pleasures, PC Problems."

[Question] Perhaps the title should be turned around. In Hungary a computer is still the pleasure of only a few, and everyday people hear more about problems than pleasures.

[Answer] I think it's the other way. Whether we are talking about users or computer technicians the pleasures, in my opinion, predominate today. I do not believe there was a time in Hungary when we could follow the most developed capitalist countries by 1-2 years in the quality and performance of computers. If we overlook the quantitative problems this is the situation now, at least in regard to the so-called professional personal computers. Today the domestic users have access to even the most modern machines.

[Question] Only the question is, At what price? In Hungary today an imported machine from the Far East in the same category as an IBM personal computer can be obtained for around 300,000-400,000 forints in general. As long as the prices are so high the absorbing capacity of the market is probably limited to only a few thousand units.

[Answer] A few years ago only a few enterprises could have a computer. Then the high performance professional personal computers appeared. At first they were asking more than 2 million forints for them, then the prices fell below one million, and today there are some cheaper than half a million. This process meant that several thousand domestic enterprises started into computer technology development which could not have thought about it independently before. So there was a great leap with the appearance of the professional personal computers; in the present situation we again have a chance of following more quickly the developments in the countries with a developed computer technology. While our lag compared to the West in other computer categories is 8-12 years it is less in regard to personal computers, and it can be worked down to 1-2 years.

[Question] But all this would require more favorable market conditions.

[Answer] It is a fact that there are not several hundred thousand professional computers in Hungary as there are in the FRG or even Austria. Each year here barely 2,000-3,000 high performance machines get to the users and the total of such machines is not more than 6,000-8,000. According to last year's prediction by the KSH [Central Statistics Office] only 8,000 will find owners by 1990. But in my opinion it would be a great error to start from this number in planning, because within 5 years demand could reach 50,000 units. The professional computers will be increasingly accessible compared to the medium and larger category machines, which will still not come into the country in considerable numbers. According to our experience virtually every data processing problem at a domestic enterprise of average size can be solved on the so-called local networks organized out of already existing high performance personal computers. Only 10 percent of the enterprises will need machines with greater performance than these have.

[Question] For weeks professional public opinion has been occupied with the possibility that there will shortly be a central effort to "create order" on the personal computer market. In your opinion, what sort of changes might we count on?

[Answer] Hungary cannot assume a leading role within a foreseeable time in computer technology or in regard to personal computers therein. We can only choose among various forms of following. Thus far, fortunately, we have been able to follow the development of the personal computer market relatively quickly. There must not be any negative change in this. I hope it will not go in the direction of having state guiding organs, which have thus far left this market pretty much to itself, or more precisely have let it operate freely, want to try to create a certain order now. The computer inventory should be more uniform and the prices should come down further still. I hope that with the personal computers coordinated large numbers will come into the country and the prices can fall further to a significant degree.

What We Can Do and What We Can't

[Question] Many feel that it is not worth it to manufacture professional personal computers because they can be obtained ready-made more cheaply than in the form of parts.

[Answer] A personal computer consists of relatively few subunits. Whether we buy them separately or in an assembled state changes the price very little. Assembled the machine is only a few percentage points more expensive. So in my opinion this is not an essential question, especially not if we think that to assemble these machines one needs nothing more than a screwdriver. It is much more important whether we are capable of manufacturing some of the subunits economically. The capacity of domestic industry today, including the small cooperatives, is already suitable for producing 70 percent of the personal computer elements here at home. Our industry cannot handle the remaining 30 percent and probably this will be so in the future also. I mean such things, for example, as the monitor and large capacity fixed disk memory. It is also a fact that manufacture of very many of the parts which could be made here is not yet economical.

[Question] Recently six of the small organizations playing a significant role in distribution of professional personal computers--Microsystem was one of them--"federated." What is the essence of this federation?

[Answer] The Instrument Technology, Szamszov, Controll, Data Manager and Applications Technology small cooperatives and the Tradecoop trading house decided to create an association under the name Per-Comp Developmental Deposit Association. The combined turnover of the small cooperatives brought together in Per-Comp exceeded 1.5 billion forints this year and their share in professional PC trade is more than 60 percent. We want to coordinate certain of our activities, but we will basically maintain our independence. We federated because we feel that, for example, harmonizing our acquisitions, doing this jointly, will benefit all of us. To give a concrete example, acquiring a multilayer printed circuit manufacturing machine line will pay only as a joint project, partly because such a machine is expensive and partly because we could not fully exploit it separately.

[Question] How will this cooperation affect PC prices?

[Answer] Marketing will continue to be done separately, so I can speak only in the name of Microsystem. According to our plans, if all the conditions can be created, we will be able to sell an assembled PC-XT, with guarantee, for under 200,000 forints next year. The price of a PC-AT under similar conditions will be under 250,000 forints, or barely half the present price.

Tax Seesaw

[Question] Out of the several hundred small cooperatives there are a few--Microsystem among them--which are growing at an incredible rate. To what, in your opinion, can this be attributed?

[Answer] Unambiguously we can thank the professional PC's for the swift development. We started from nothing at the beginning of 1983. There were 15 of us, we put in 12,000 forints each so work could get started. This year our turnover will be 500 million forints. Personnel has grown to 80, but we do not want to go above this even in the longer run.

[Question] What is the decision making mechanism at Microsystem?

[Answer] A four person council guides the small cooperative; it makes decisions in every essential question practically every day. Whether we should assume credits or buy an office, what direction we should go in, these things are decided by the general meeting. Ownership awareness is high in everyone in the cooperative. So the members have a say in things. Many leaders, who were in guiding positions at a large enterprise in their "previous lives," had to get used to this.

[Question] Small cooperatives are considered one of the most advantageous organizational forms. Do you feel this too?

[Answer] This form is advantageous up to a certain size. The members are interested in increasing the profit, and this form makes possible very great flexibility. Administrative personnel can be kept to a minimum. We have barely two people dealing with all administration. So the overhead costs are low. But the profitableness of the small cooperatives is slowly approaching the enterprise level. The profit tax is already 38 percent. (Over the last 4 years--this is instructive--the profit tax keys for computer technology small cooperatives have changed as follows--18 percent, 9 percent, 28 percent, 35 percent, 38 percent.) The turnover proportional profit of Microsystem moves around 15-20 percent anyway.

[Question] Are the rumors about the extraordinarily high incomes of computer technology small entrepreneurs true?

[Answer] They are true. I do not like obscurity about incomes. We work for every penny, and we pay taxes on every penny. An engineer with 8-15 years experience, speaking several languages, earns more than 20,000 forints with us, with 10-12 hours work a day. I think their performance is comparable with any of their Western colleagues....

8984
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´ROBOT 86´ INTERNATIONAL EXHIBITION HELD IN CSSR

East Berlin FEINGERAETETECHNIK in German No 8, 1986 pp 377-378

[Article by Dr D. Hennecke, Ilmenau Technical School: "Exhibitions--´ROBOT 86´ in Brno"]

[Text] The international exhibition "Robot ´86" took place from 26 February to 4 March 1986 in Brno, Czechoslovakia. This exhibit, which is traditionally held every second year, was open parallel to the exhibits "Welding" and "Autoprogress."

A Chamber of Technology (KDT) student delegation had the opportunity to visit the exhibition.

Multipurpose industrial robots from factories, research institutes and colleges of nine countries, including the GDR and other socialist countries, were demonstrated. Due to the constant increase in the application spectrum of industrial robots, it must be considered natural that robots were presented at all three of the above-mentioned exhibitions. Along with industrial robots, exhibits from related areas such as measurement/testing equipment and guidance and automation equipment were displayed.

Below is a list of selected industrial robots of special interest to mechanical engineering technology:

--VUKOV Presov (CSSR) presented, among other things, the modular industrial robot system APR-2.5. It consists of translation and rotation modules which can be driven electrically or pneumatically. The position accuracy of the modules lies between plus/minus 0.02 mm and plus/minus 0.05 mm. Weight capacity is 2.5 kg.

--The machine tool ("manipulator") MX001, from the same firm, was developed by the VUMA Research Institute and is one piece of equipment in a development series. It is pneumatically driven, has a DSS structure and a hand-held weight of 2 kg. The repetitive accuracy is plus/minus 0.1 mm.

--The machine tool AM 1-T from ZPA Dukla Presov (CSSR) has two arms, each with a 1.25 kg (2.75 lb) carrying capacity. It is intended for installation and removal operations with a repetitive accuracy of plus/minus 0.2 mm.

--The same firm presented AM-5, a somewhat larger machine tool which likewise has two arms, each with a 5-kg carrying capacity.

--For the removal of plastic residue from injection molding machinery, VUKOV offers the machine tool MP H-1. It can weigh 1.75 kg hand-held, and its position accuracy is plus/minus 2.0 mm.

--The Warsaw MERA-PIAP INstitute demonstrated mounting solutions with the industrial robot IRb-6. A mechanical sensor is used here which monitors the mounting force applied. The handling and mounting done by four parts was demonstrated with the claw, which worked as an exterior and interior grasper.

--The modular industrial robot system PR-02 was demonstrated by the same institute: it has already been in production for some time. It is a pneumatically-driven modular system. The MINI-MAN System is now being offered as an enhancement for this system. It achieves position accuracy of plus/minus 0.02 to plus/minus 0.05 mm and has a 1 kg carrying capacity.

--NOKIA Helsinki (Finland) displayed the industrial robot NS-25 next to the familiar Poima machines. This arc welding robot has five pivots and is equipped with a DC motor. For assembly purposes, a tool exchange system was developed which is offered in two sizes (4 kg and 8 kg carrying capacity). Over 30 contacts can each carry up to 8 amp simultaneously. A three-way claw, which saves many claw changes during assembly, was interesting.

An important element of automatic parts assembly is the use of mounting procedures which are suitable for automated processed. KUKA (FRG) offered an automatic tool for encircling, which is attached to an industrial robot IR 160/60 with a tool exchange system.

A good number of peripherals for industrial robot equipment were shown at the exhibition. Worthy of praise were:

--Microprocessor-guided two coordinate PPJ-1 from VUKOV. Travelling range of 300 mm on each axis, with repetitive accuracy of plus/minus 0.1 mm and carrying capacity of 15 kg are selected parameters.

--Turntable PJ-2, likewise from VUKOV, which has a capacity of 2 kg and a 300-mm diameter.

--VUKOV optical electronic sensors already known and with application in conjunction with automation tasks:

--Safety scanner BS-1

--Retrofit flexible scanner ORS-1

--Light sensor DV 1/DP 1

--Gates to control falling cutting waste, PS-1

The Technical Schools of Kosice and Brno were represented with their own numerous exhibition stands. The Kosice displayed the following:

--Robotized mounting system RMS-2 (conceived for student education)
--Robot claws
--Hydraulic module industrial robots HYMR-50

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CEMA DIVISION OF LABOR IN FLEXIBLE MANUFACTURING

Prague STROJIRENSKA VYROBA in Czech No 9, Sep 86 pp 667-671, 707

[Article by Engineer Stanislav Lafek (Federal Ministry of General Engineering, Prague) and Engineer Karel Svoboda, CSc, (Engineering Technology and Economics Research Institute, Prague): "Development of Flexible Automation in the CEMA Countries"]

[Text] Development to Date

The NC machines, industrial robots, and the first integrated manufacturing sections with NC machines, which the CEMA countries developed in the late 1960's and early 1970's, paved the way to a considerable extent for the development of flexible manufacturing in these countries. In view of this evolution, the CEMA Permanent Commission for Cooperation in Engineering adopted a program of multilateral cooperation in research and development. And, on the basis of this commission's recommendations, the interested CEMA countries signed a multilateral agreement on specialization and cooperation in the production of NC machine tools. The attained development of flexible manufacturing in the CEMA countries was preceded by R&D projects that the individual countries undertook entirely on their own, without any extensive mutual cooperation [1].

Bulgaria

Two manufacturing sections, equipped with NC machine tools and direct numerical control, were placed in trial operation in 1976 and 1977, respectively. The first manufacturing section, intended for fabricating parts that are solids of revolution, has four NC lathes with direct numerical control, and two robots. The other section, intended for fabricating box-type parts, consists of four machining centers with direct numerical control, and a materials-handling system that moves the palletized parts on a rail-mounted cart. A manufacturing section has also been developed and placed in operation, for machining the rotors of electric motors. It has four NC cylindrical grinding machines with direct numerical control, and four overhead robots of the PIRIN type. A system has likewise been developed for machining flanged and box-type parts of gears. And standard flexible manufacturing cells have been designed, with NC machine tools, robots, tool changer-tool holder magazines, controllers, etc.

The KPMI Georgi Kostov plant in Sofia has in operation a production line for machining the rotor shafts of electric motors (six to eight types). The production line has eight NC lathes linked by a chain conveyor, on which the individual fixture-mounted workpieces are transported. The first work station on this production line is a machine that squares the ends and marks the centers. Each work station is equipped with a PIRIN portal manipulator that automatically exchanges the workpieces.

This same factory has in operation also a computer-aided manufacturing system that makes the light-alloy end shields of electric motors. Fig. 1 shows this system's layout.

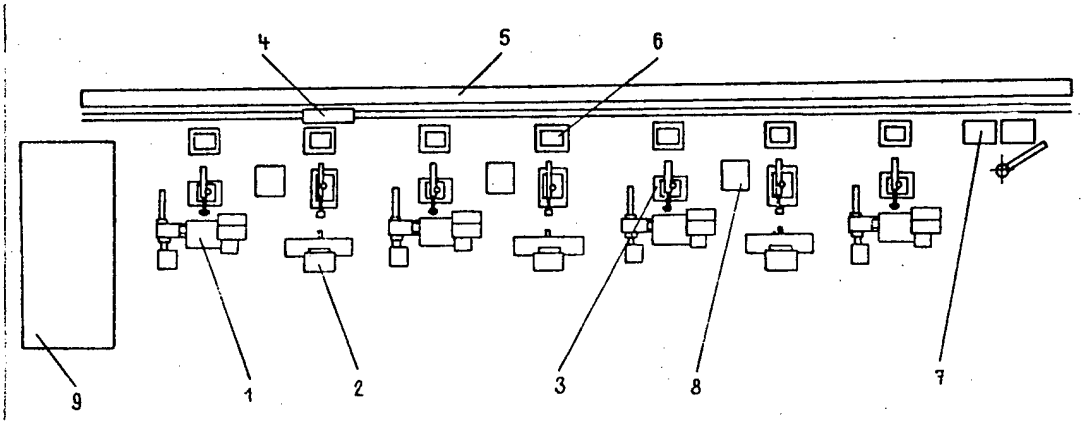

Figure 1. Layout of CAM System for Making the Light-Alloy End Shields of Electric Motors

Key:

1. CNC lathe SE 062.10
2. CNC milling machine RV 001.10
3. Ind. robot RB 241 FANUC
4. Stacker
5. Storage rack
6. Pallets with accurately oriented parts
7. System's input, output
8. Control, monitoring station
9. System supervisor

The CAM system has seven work stations (four CNC lathes CE 062, and three CNC milling machines RV 001). The work stations are located along one side of the stacker's track. An industrial robot (RB 241) with FANUC control tends each work station. On the other side of the track is the in-process storage rack (30 bays, four tiers), with locations for storing pallets measuring 800 by 1200 mm at their base. The rack stores standard transport pallets, workpiece pallets, and tool-and-fixture pallets. The workpiece pallets ensure the accurate positioning and orientation of the end shields, which permits automatic manipulation by robots at the work stations. The elements for the oriented positioning of the shields on the pallet (pallet's superstructure) are exchangeable to fit the parts. Each work station has a turntable on which the stacker deposits the pallet with the workpieces.

Hungary

The first flexible manufacturing system was placed in operation in 1973. It comprises two NC lathes with direct numerical control, a minicomputer, and an industrial robot. Subsequently the DIAGON 500 integrated manufacturing

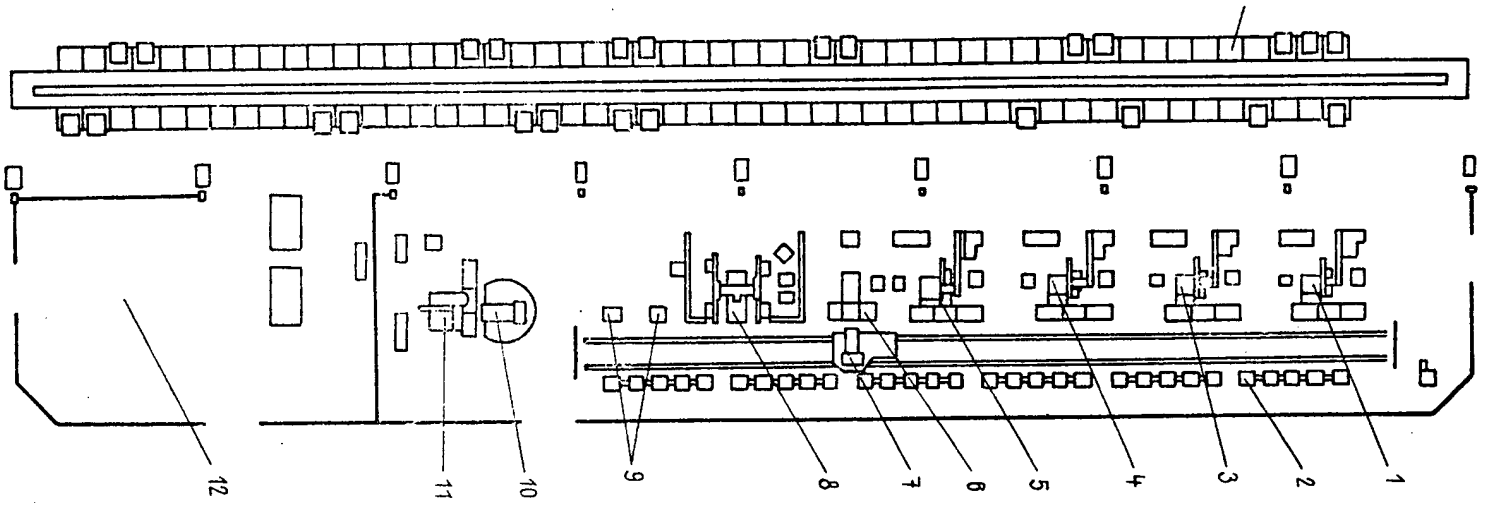

Figure 2. The IGYR 630 Integrated Manufacturing Section

Key:

1. Chucking lathe
2. In-process storage
3. Horizontal machining center
4. Horizontal machining center
5. Vertical machining center
6. Cleaning machine
7. Cart for exchanging pallets
8. Testing machine
9. Equipment for pallet assembly
10. Equipment for exchanging pallets
11. Work station for machining base
12. Stockroom

section was implemented, for the machining of parts that are not solids of revolution. It consists of four machining centers with a tool changer-tool holder magazine containing 30 tools, and a turntable that accomodates workpieces with maximum dimensions of up to 500 mm. The machining centers have direct numerical control, using an R-10 computer. This computer downloads to the CNC control systems, and machines, the programs and other data necessary for automated machining. The computer also controls the production process, i.e., the flow of workpieces. The Machine-Tool Factory of the Csepel Works in Budapest has in operation an IGYR 630 integrated manufacturing section (Fig. 2), intended for the machining of box-type parts [3]. The system comprises horizontal, vertical and universal NC milling machines with direct numerical control, built by the Csepel Works. A special materials-handling system is computer-controlled, pallet-oriented, and linked with a multitier automatic storage and retrieval system. Cleaning and inspection of the machined workpieces are likewise automated and computer-controlled. Of the two TRA 70/1025 minicomputers used to control this manufacturing system, one functions as an intelligent terminal of one of the mainframes at the Csepel Works.

In addition to the in-house experts of the Csepel Works, also the personnel of 40 other firms and institutions helped to design this system. But the most important contribution to developing the IGYR system's control was the work done at the MTA SZATAKI (Computer Applications Research Institute of the Hungarian Academy of Sciences).

German Democratic Republic

The ROTA-F 125 NC system, a CAM section with NC machine tools for machining flanged parts up to 125 mm in diameter, was built in 1971. Subsequently the ROTA-FZ-200 system was built for machining spur gears; and the PRISMA-1, PRISMA-2 and Aurbach M 250/02 CNC systems, for machining box-type parts. The Union Machine-Tool Plant in Gera has in operation a more advanced, integrated manufacturing section consisting of NC machine tools, for the machining of box-type parts. The backbone of this CIM section (the German abbreviation is IGFA) is a two-row storage rack (five tiers, 25 bays) with a computer-controlled stacker. Two pallets can be stored in one storage location. The NC, conventional, and manual work stations are located along the two sides of the storage rack. Of the 20 work stations in all, two are machining centers equipped with pallet exchangers. In the storage rack's first tier, each work station has between 4 and 12 assigned storage locations (the average work station has 6) for storing the manually guided carts that move the pallets containing parts, respectively tools and fixtures, between the storage rack and the work stations. The pallets for parts are the same as the ones for tools and fixtures, except the latter have special inserts (and are stored in the rack only one day). The number of lots handled per lot produced is 1.5 on average (but may be 10 at most).

Three levels of computers (from the enterprise's mainframe to on-board computers) control the CIM section, in a way that ensures compliance with the GDR regulation that NC machines must operate at least 20 hours a day.

Larger CIM systems comprising several subdivisions have also been designed in the GDR. One such system was implemented in 1982 at a factory of the

7 October Combine in Berlin. Its three CIM sections--for parts that are solids of revolution, respectively for cylindrical parts and box-type parts--have a common control system.

A small subsidiary, Wema [Machine Tools] Saalfeld, is implementing in stages the design of an entire CIM factory. Its three machine systems, expected to be operational in 1986, will automate the entire factory's production [4].

Poland

In Poland, three CAM sections were developed and placed in operation in 1977-1979. One (the KOR-1 system) is for machining box-type parts. The other two, for machining parts that are solids of revolution, are as follows:

--The TOR 1/01 manufacturing section is intended for machining cylindrical parts by turning, threading, spline milling, and cropping. The section has a storage and retrieval system for the palletized workpieces;

--The TOR 1M manufacturing section is intended for machining cylindrical parts by turning, drilling and threading. The nonpalletized finished shafts and semifinished products are removed with the help of an industrial robot and three radial stacking conveyors.

The TOR 1 manufacturing section is intended for machining cylindrical parts 25 to 88 mm in diameter, 100 to 800 mm long, and weighing up to 25 kg. The section performs the following operations:

--Squaring the ends and marking the centers;

--Turning the exterior shapes, threading, spline milling and recessing;

--Milling of keyways and other planes on the surface.

The workpieces are manipulated in the manufacturing section on pallets. Depending on the shaft length, the workpieces on a pallet may be in one row or stacked two or three high. This corresponds to 8, 16 or 24 shafts per pallet. The production process in the TOR 1 manufacturing section flows as follows:

--At the loading-unloading-inspection station, the operator loads the shafts onto pallets. The shafts are brought to this station in containers, and 20 pallets are loaded at one time;

--A pallet-routing conveyor moves the pallets between the storage rack and the automatic machining stations or the loading-unloading-inspection station, as the technological process requires;

--The individual machining stations perform automatically their part of the technological process, on all the shafts on a pallet;

--After the completion of machining, the pallets are returned to the loading-unloading-inspection station. There the workpieces are unloaded from the pallets and undergo technical inspection.

Fig. 3 is a block diagram of the TOR 1/01 manufacturing sections.

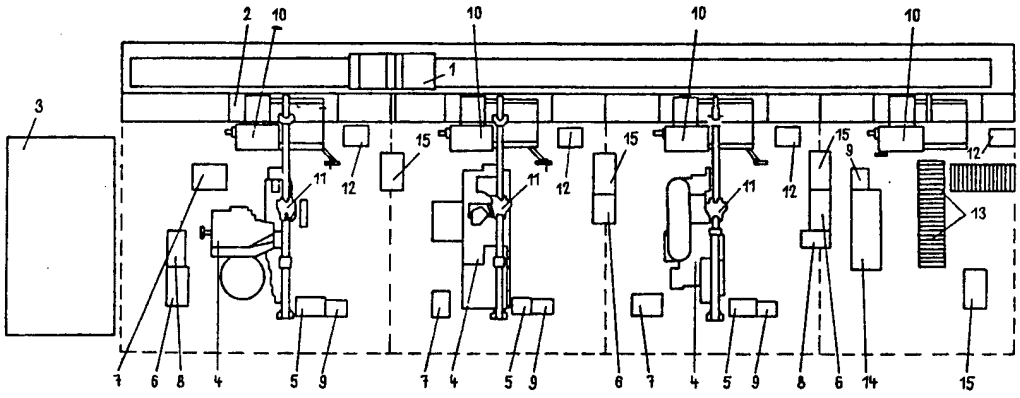

Figure 3. Block Diagram of the TOR 1/01 Manufacturing Section

Key:

1. Pallet-routing conveyor
2. Storage rack for pallets
3. Supervisory control station
4. Machine tool
5. NUMS numerical control system
6. Interface
7. Hydraulic loader
8. Spindle drive control
9. Monitor
10. Work-station conveyor
11. Conveyor for removal of shafts
12. Hydraulic workpiece loader
13. Roller conveyors
14. Inspection station
15. Control system

Romania, Soviet Union

There will be separate contributions devoted to the development of flexible automation in manufacturing in these two countries.

Further Cooperation

At its 111th session, the CEMA Executive Committee discussed the problems of accelerating the development of flexible manufacturing systems in the CEMA countries. It instructed the CEMA Permanent Commission for Cooperation in Engineering to draft a General Agreement on Cooperation, and a Cooperation Program, for the CEMA countries and Yugoslavia, regarding the research, development, specialized production and coproduction of standard flexible manufacturing systems, flexible manufacturing cells, and their most important modular subsystems and components. For the sake of comprehensiveness, the CEMA Executive Committee ordered the permanent commission to do the following:

--To elaborate methods, technical guidelines and manuals, and programs for unification, type designs, and standardization;

--To adopt in the individual countries measures for the training of scientists, engineers and professional technical cadres in this field;

--To cooperate on the basis of a unified program, and to coordinate all efforts within a single CEMA body (the Committee for Cooperation in Engineering), but linked to the contractual cooperation that exists in the field of robotics and control computers;

--To include in the designing of flexible manufacturing system, besides the subcommittees of the CEMA Committee for Cooperation in Engineering, also other CEMA bodies and international organizations (the VVTS [Committee for Cooperation in Research and Development], the SKREP [Permanent Commission for the Radio Engineering and Electronics Industry], the SKN [Permanent Commission for Standardization], the MVK VT [Intergovernmental Commission for Cooperation in Computer Technology], INTERELEKTRO, etc.).

The work that the Cooperation Program calls for will be done within the CEMA bodies and the CEMA countries' international business organizations specified in the Cooperation Program; furthermore, on the basis of the multilateral and bilateral agreements and contracts concluded by the designated agencies and organizations of the contracting parties' states. The contracting parties will adopt measures to ensure that the mentioned agreements and contracts spell out the essential cooperational obligations, including the following: comprehensive research and development, planning and design, and experimentation; production startup; production specialization and coproduction; marketing; installation, debugging and servicing of the products; operator training; and, in individual instances, also the formation of joint ad hoc teams of specialists.

The CEMA Committee for Cooperation in Engineering will: coordinate all the work the Cooperation Program calls for; monitor its progress and fulfillment of the obligations stemming from the General Agreement on Cooperation; and draft proposals for the further development of cooperation in the area of flexible production systems.

So far as the work on standardization under the Cooperation Program is concerned, it is to lead to the adoption of CEMA standards. The agencies and organizations of the contracting parties' states will perform this work within the appropriate CEMA bodies and the member nations' international business organizations, in accordance with the CEMA Statutes on Standards.

Cooperation Program to Develop Flexible Automation

The Cooperation Program that fleshes out the General Agreement on Cooperation is divided into 11 sections, and these in turn are subdivided into tasks and subtasks.

Section 1. Organization of cooperation on the long-range questions of development, basic research and the elaboration of technical guidelines and manuals.

Number	Designation of problem and work to be performed	Coordinator
1.1	Elaboration of the principal directions (concepts) of the technical development of flexible manufacturing systems (FMS's), materials-handling and storage systems, control and diagnostic equipment, tooling, industrial robots, and the principles of building FMS's, with due consideration for the tasks in the fields of computer-aided manufacturing (CAM), computer-aided design (CAD) and computer process control (CPC) systems, their software and algorithms, effective areas of application, and the methods of designing them and ensuring their operation in the following FMS's:	
1.1.1	For machining by chip-removing processes	USSR
1.1.2	For two- and three-dimensional forming	CSSR
1.1.3	For casting	USSR
1.1.4	For arc welding	Poland
1.1.5	For spot welding	USSR
1.1.6	For organic-chemical coating	Poland
1.1.7	For assembly in the automobile industry	USSR
1.1.8	For assembly of engineering products	CSSR
1.1.9	For electric heat treatment and plasma-arc machining	USSR
1.1.10	For electronic products	Bulgaria
1.1.11	For electrotechnical products	Bulgaria
1.1.12	For integrated FMS's	USSR
1.2	Elaboration of a standardization program in the field of FMS's	
1.3	Elaboration of CEMA norms, technical guidelines and manuals, pursuant to the program under item 1.2	
1.4	Elaboration of methods for feasibility studies in specific manufactures whose automation by means of FMS's is being considered	
1.5	Compilation of complete catalogs of FMS equipment and components that the CEMA countries and Yugoslavia --Produced in 1986 --Will start producing in 1988	

Section 2. Development, introduction and organization of the coproduction and specialized production of FMS's with unified subassemblies.

Section 3. Development, introduction and organization of the coproduction and specialized production of modular industrial robots, their modules, sets, components and subassemblies.

Section 4. Development and organization of the coproduction and specialized production of storage and retrieval systems (including induction-guided vehicles) and central scrap collection systems.

Section 5. Development and organization of the coproduction and specialized production of programmed control equipment for FMS's, measuring equipment, diagnostic aids, and sensors.

Section 6. Development and organization of the specialized production and coproduction of standard computer control systems (central computer systems) for FMS's, including the necessary peripherals and software.

Section 7. Development and organization of the specialized production and coproduction of the CAD hardware for FMS's, together with the systems software and applications software.

Section 8. Development and organization of the specialized production and coproduction of electrical equipment for FMS's and their work cells.

Section 9. Development of software for FMS's, using unified high-level languages.

Section 10. Design of FMS's for various technologies, intended for the CEMA countries and Yugoslavia.

Section 11. Training and retraining of cadres for designing and operating FMS's.

The background of Czechoslovakia's active participation in the General Agreement on Cooperation is as follows:

--Extensive effort has been devoted in Czechoslovakia to the research and development, production and testing of flexible manufacturing systems, specifically: in 1971-1977, under the state R&D task No P-15-124-023, "Integrated Manufacturing Sections in Engineering"; in 1973-1984, under the R&D Plan's state task No P-15-124-060, "Flexible Production Systems in Engineering"; in 1976-1985, under state tasks P-15-124-242, "Model Manufacturing, Control and Social System of an Engineering Enterprise"; and, as applications of the mentioned solutions, CAM systems have been or are being built in many Czechoslovak plants.

--By its resolution No 47 of 1 March 1984, regarding the concept of developing machine tools and forming machines under the 8th Five-Year Plan, the Federal Government's Presidium designated as a progressive direction the comprehensive introduction of NC machines, primarily in the form of CAM systems with computer-controlled storage and retrieval.

--By its resolution No 168/1983, the Federal Government's Presidium approved the development of robotic work cells.

--There are funded research organizations capable of participating in the research and design of flexible manufacturing systems.

--The R&D Plan for the 8th Five-Year Plan includes state task P-15-124-422, "Unmanned Machining Work Station."

In Czechoslovakia, implementation of the General Agreement on Cooperation will be predominantly the responsibility of the Federal Ministry of General Engineering, the Federal Ministry of Metallurgy and Heavy Engineering, the

Federal Ministry of the Electrotechnical Industry, and their respective subordinate organizations. The Czechoslovak delegation on the CEMA Committee for Cooperation in Engineering will establish in Czechoslovakia an appropriate coordination center to coordinate this cooperation.

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CSO: 2402/15

SURFACE MOUNTING TECHNOLOGY AT HUNGARIAN MICROELECTRONICS ENTERPRISE

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian No 8-9, 1986 pp 259-262

[Article by Istvan Deak, Microelectronics Enterprise: "Surface Mounting Technology for Thick Film Hybrid Circuits at the Microelectronics Enterprise"]

[Excerpts] The author discusses mounting technology for thick film integrated circuits. He deals with the mounting and soldering of chip parts. He gives a brief description of the surface mounting laboratory created by the MEV [Microelectronics Enterprise] and the MHE [Hungarian Communications Engineering Association].

3.2 Mounting the Parts

Several methods for mechanically locating the parts on the carrier are known. So-called "pick and place" automatic devices locating the parts individually are most economical for assembling circuits manufactured in smaller series--this is characteristic of the thick film IC manufacture taking place at the MEV. A single picking head moves in these, picking the parts from a vibrating feeder or some sort of store.

The automatic assembly device at the MEV is self-teaching, which means that when assembling a new type of circuit the placement of the parts must be controlled by hand the first time, after that the machine automatically mounts the part. The memory of the device can store 200 placement positions at a time, so it can locate a maximum of 200 parts on one circuit. In addition it has a stepping capability; that is, it can load parts on a number of carriers placed side by side in one cycle.

The equipment can handle two types of picking head; exchanging these must be programmed in depending on the size of the parts. The picking heads pick up the part by vacuum, which according to experience is not sufficient in every case to ensure the proper placement precision. The problem is caused by the occasional movement of the larger parts in the picking head, most commonly when the head moves after the pick-up. This is eliminated in the newer type automatic mounting devices in that after the vacuum pick-up the part is grasped mechanically, which positions it as well as holding it.

4. Summary

As a result of the reconstruction of the thick film research and development and small series manufacture base of the Microelectronics Enterprise a few years ago the modern surface mounting of thick film circuits became an everyday practice. The manufacturing experiences thus far have been favorable and many of them can also be used in the manufacture of circuits built on printed wiring sheets.

In the interest of sharing these experiences with equipment manufacturers the MEV has established a surface mounting technology laboratory, jointly with the Hungarian Communications Engineering Association and with the material support of the OMFB [National Technical Development Committee].

Here those equipment manufacturers wishing to use the technology will be able to master the surface mounting technology. In addition, we want to aid the domestic spread of this modern assembly technology by making free prototypes and by manufacturing circuits in smaller series.

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CSO: 2502/10

SURFACE MOUNTING TECHNOLOGY AT HUNGARIAN REMIX RADIO ENGINEERING FACTORY

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian No 8-9, 1986 pp 281-285

[Article by Dr Tamas Varkonyi, Remix Radio Engineering Enterprise: "Effect of Surface Mounting Technology on Electronic Equipment Manufacture"]

[Excerpts] The author discusses fundamental questions of the surface mounting technology. He analyses the advantages of the technology in a comprehensive way. Following a description of the international situation he outlines the plans of the Remix Radio Engineering Enterprise.

9. The Plans of Remix

Recognizing the necessity of a forced renewal in this area the Remix Radio Engineering Enterprise will begin significant developments during the Seventh 5-Year Plan in the area of spreading both parts which can be surface mounted and the printed wiring technology for surface mounting. It will thus become possible for the domestic electronics industry to use modern, mass produced and favorably priced passive elements. We are also dealing with the introduction of the manufacture of chip carriers.

Last but not least we must speak about the fact that Remix--on the basis of its significant hybrid technology past--is undertaking to develop a domestic surface mounting knowledge base ("know-how" if you like). In this way it will be possible at Remix to design, produce and test surface mounted printed wiring as a service for outside enterprises.

The surface mounting technology developed by us is available to every enterprise. With the free designing and prototype manufacture of printed wiring sheets we take over from the user the risk of introducing a new technology. It is to be hoped that the surface mounting technology theme started at Remix with the effective support of the National Technical Development Committee and the Ministry of Industry will bring real results for domestic equipment manufacture.

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ACTIVITIES OF GDR SCIENTIFIC EQUIPMENT CENTER

East Berlin SPECTRUM in German No 10, 1986 pp 4-6

[Interview with Prof Dr Sc Techn Norbert Langhoff, director of the Center for Scientific Instrumentation, by Jochen Maemecke: "A Catalyst for Science and Technology"; date and place not given]

[Text] Scientific instrument design is both the source and the effect of productive research. Its development program and what it has to offer are basically determined by lines of innovation and key technologies.

[Question] The need to expand Berlin as a scientific center and a center of key technologies necessitates also an adequate support for scientific instrument design as a prerequisite to productive fundamental research measuring up to current international standards. What special responsibility does this imply for the 1,600 workers in your facility?

Langhoff: It is certainly quite well known that our activities perform a decisive catalyst function in accelerating scientific-technical progress. Therefore scientific instrument design both as prerequisite to and result of research will continue to develop in the future into an ever more important constituent of the research processes of the Academy of Sciences of the GDR. Thus in the unity of scientific-methodological research together with the development, design, production, and application of effective instrument technology the tasks of our center will have their proper place in the primary research interests of our academy.

To an even greater degree the results of scientific instrument design must become germ and constituent both of our national economy's exploitation of scientific-technical research results in industrial practice, but must also lead to the rationalization and intensification of research work itself. In other words, we see this especially under the aspect of innovation, in other words, in terms of questions arising in key technologies. We are concerned with progress in such domains as microelectronics, optoelectronics, communication and information technology, biotechnology, and laser technology.

As instrument designers we can solve these problems only by working in close cooperation with the basic research facilities of the Academy of Sciences of the GDR, of the scientific academies of socialist countries, and with the

industrial combines of our own country. Such cooperation will be in thematic complexes occupying the front lines of scientific development.

[Question] For years now facilities of the academy have been doing research in the area of biotechnology. This has aimed particularly at uncovering the causes of various illnesses, at establishing prophylactic procedures, and creating tailored pharmaceuticals. This research has also been carried out in the interest of agriculture, veterinary medicine, chemistry, and other fields. What contributions is the center for scientific instrumentation making in these directions?

Langhoff: As instrument designers we were being well advised a few years ago when we aimed at such problems in planning our Mytron Division in Heiligenstadt. Without this initial planning and without the instruments manufactured there for biotechnological and microbiological research tasks it would today be impossible to deal with many scientific questions and problems arising in academic and advanced school facilities as well as in those of industry.

Thus it has been possible for the development and production collectives of our Heiligenstadt division to push ahead with work in the domain of fermentation technology. This has been done on the basis of experience gained through licensed production of laboratory fermenters originating in the Czechoslovakian Academy of Sciences. It has also been the result of close cooperation with the institutes of bioscientific and medical research and with the former Institute of Chemical Engineering. The creation of a microcomputer-integrated laboratory fermenter has placed at our disposal a new system of instrumentation for the investigation of microbiological metabolic processes. This is an instrumentation system which aims at prospective tasks emerging both in microbiological research and also in the industrial manufacture of pharmaceuticals and sera, yeasts, proteins, and products in the area of fermentation chemistry.

This biotechnological development and fabrication program is further augmented by equipment for maintenance and control of biological climates in the gaseous phase--polygaseous incubators, indoor air filters--together with a multitude of other laboratory instruments.

Through this reinforcement of biotechnological studies through the assistance of instrumentation and research technology and also through cooperation in appropriate scientific-strategic tasks the Center for Scientific Instrumentation contributes to the realization of the overall program of the complex task of biotechnology in the GDR.

[Question] In the beginning of this interview you mentioned laser technology. The scientists of the Center for Scientific Instrumentation must certainly be very attentively pursuing international trends in this promising area. What in particular are you concerning yourself with here?

Langhoff: At the present time we are primarily interested in problems related to so-called ultrahigh-speed spectroscopy. In this area our research and development partners are the Friedrich Schiller University in Jena, the Central

Institute for Optics and Spectroscopy in our academy, and the Carl Zeiss VEB in Jena. Thus in cooperation with these partners something has been produced which has sufficient quality to establish a world standard. This is a laser-pulse fluorescence spectrometer which is already in its first assembly line production by the Carl Zeiss VEB. This device has the great advantage that in addition to providing spectroscopic data it also furnishes information about the kinetics of processes. The scientist or the industrial specialist is now in a position to simultaneously obtain information both about the spectral distribution in samples and also with regard to the temporal sequence of events in the process. This is important for example in catalysis research and also in bioscientific investigations such as those into cytological research on the molecular level.

The entire instrumentation system of ultrahigh-speed spectroscopy--special lasers, detection systems, interaction units, and other devices--is constructed on the modular principle. This is so that it will be possible to assemble an optimal instrumentation system for each application. Thus our clients receive from us an instrument technology which is suitable for their special projects.

The areas of application of this instrument technology are primarily such domains as photochemical elementary reactions and photophysical primary processes, metabolism and energy transfer in biological systems, processes of semiconductor physics, and still other fields of investigation.

The laser light sources and other instrumentation technology developed in our center and made available for the tasks of research and practice find further application in the widest variety of technological and metrological areas. Such applications are, for example, in microelectronics--I am thinking of the measurement of optical films in the process of vapor deposits--or in the development of machine tools where they are a constituent of interferential measuring devices or pass measuring systems for high-precision measurement of lengths and for positioning computer-controlled machines.

Also our development collectives in the area of ultrahigh-speed spectroscopy are doing groundwork for and lending support to the use of their instrument technology in medicine or in the optimization of energy-efficient combustion processes.

In this connection I would also like to mention another accomplishment which is unrelated to laser instrumentation, but rather is based upon the principle of the Fourier analysis of signals. Here--as in the case of the above-mentioned examples--the important thing is the immediate connection existing with industry. Together with colleagues in the Metrical Electronics VEB in Berlin we are developing, on a modular basis, a system of Fourier analysis with which new fields are being opened up in the technology of measurement. Thus, for example, this Fourier analysis system is of great importance in the prophylactic testing of engineering installations such as turbines and generators in power plants. Engineers are aware that a generator possesses a natural "language" in the form of a characteristic acoustic frequency spectrum which is diagnostic of the functional condition of the installation. But as soon as something changes in that installation at any location--for example, when a

bearing begins to show the first slight signs of wear--the engineer can detect this with the aid of the Fourier analysis system. There is an alteration in the noise behavior and this is an alarm signal for the technician. Here there still remain interesting problems confronting measurement technology, factory operations technology, and the technology of process measurement. We still possess too little experience in applications; with partners in industry we still need a certain amount of breaking-in time in order to be able to distinguish "healthy" and "sick" noise patterns and their causes. Here, too, it was the aim of our development collectives, building upon scientific-technical results available at our center, to transfer to our industrial partners without delay results suitable for industrial mass production. At the same time it has been our object to employ the above-mentioned modular style of construction to make this instrumentation development usable also in broader areas of application.

[Question] The GDR is among the most important exporters of scientific instruments in the CEMA. These GDR exports have enlarged more than tenfold in the last 20 years. Great importance attaches to the exchange of scientific instrumentation with the academies of socialist countries. In this latter process where does the Center for Scientific Instrumentation concentrate its efforts?

Langhoff: A characteristic feature of the latest stage in international socialist research cooperation is participation in joint complex research projects in the area of scientific instrument design. In the context of this cooperation structural groups, functional units, and scientific devices are being developed and manufactured on a divided labor basis and being made available to the participating partners to an increasing degree. This bilateral or multilateral scientific-technical cooperation of the ZWG features principally scientific facilities of the academies of sciences of the USSR and of the Czechoslovak People's Republic in the domains of laser and electron-resonance spectroscopy and in the area of chromatography.

In the domain of ultrahigh-speed spectroscopy, for example, the Academy of Sciences of the GDR is making available to its Soviet partners for cooperative manufacturing, inter alia, developments in the field of optical multichannel analyzers.

For this we receive amethyst lasers, broad-band mirrors, polychromators, infrared sensors, and other high-performance instruments. This is a necessary give and take. One facility alone--even with 1,600 workers--cannot cover the entire spectrum of modern scientific instrumentation. In consonance with the focal research tasks at our academy we must therefore also give ourselves a corresponding international profile--in other words, specialize. This means that in the interest of a broad performance spectrum in the field of scientific instrument design it is necessary to come to a decision as to how one should put oneself into a position where through international cooperation one can cover those domains which are not being dealt with in one's own country. And it was this motive which more than 10 years ago caused us and the other scientific academies of the socialist countries to conclude an agreement with regard to scientific instrument construction.

The mutual exchange of structural groups and instruments has in the interim achieved a volume of over 25 million rubles annually in the academies of sciences of socialist countries. For example, one result of international scientific-technical cooperation is the fact that at the present time the third generation of computer-supported electron-resonance spectrometers of the highest performance class is being put into standardized production in the Center for Scientific Instrumentation of the Academy of Sciences of the GDR. In the development of this instrumentation, in addition to research groups of the GDR there also participated scientists from the partner academies of the USSR, the People's Republic of Poland, and the Czechoslovak People's Republic. These devices serve in the structural examination of materials in the course of research in the national sciences and in medicine. At the same time they are put to use in the national economy; for example, in the optimization of engineering catalysts or in the effective design of important experiments in microelectronics and optoelectronics. Scientific cooperation also contributed to meeting the most urgent demand for these devices in the CEMA countries.

[Question] Multilateral agreement relates to specific trends, profiling of tasks, and the development of methods of research. How do you and your colleagues put into effect the principle that such multilateral cooperation must be carried out on the basis of a bilateral bond?

Langhoff: The Soviet Union is by far our most important partner. And the reason for this is the fact that the great potential of the Academy of Sciences of the USSR also yields a corresponding level of performance in scientific instrument design. As instrument designers we are always indebted to impulses, to pioneering results in fundamental research. And thus, for example, there has developed in ultrahigh-speed spectroscopy and high-frequency spectroscopy a fruitful give and take. Our partners here, for example, are the Scientific-Technical Union of the Academy of Sciences of the USSR, the Institute for General Physics imeni Academician Prokhorov, the Institute for Physics imeni Academician Basov, and the Institute for Physics of the Academy of Sciences of Belorussia.

The interest which leading scientists of the USSR have in us is naturally also a consequence of the contributions and the potentialities which they discern in us. Our work has been distinguished by the circumstance that we have very acceptable stature, even on the international scale, in scientific instrument design in the areas of optics, precision mechanics, and microcomputer technology. We are far from being entirely satisfied, but the developments of the past 3 or 4 years have shown that we are on the right path.

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NEW POLISH ELECTRONIC PRODUCTS DISPLAYED AT POZNAN FAIR

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[Article by W. E. Schlegel]

[Text] Once again we visited the International Fair in Poznan, which this year was held from 8-15 June, and would like to report on a few interesting new Polish developments that struck us. It was impossible to miss the fact that the electronics industry of our Polish neighbors is making an intensive effort to gain access to the international level or to maintain it where it already exists. To achieve this end, Poland is seeking to import modern foreign technology, and also to develop cooperative relationships with leading foreign companies.

An important role in Polish computer technology is played by private and partially state-owned software, consulting, and service firms, which are organized as manufacturing concerns and accept assignments from research and industry. They exhibited at the fair, just as industry did, and demonstrated their capabilities as part of the Mera collective display and together with the foreign trade company Remex, which is responsible for manufacture, and also in their own pavilions. What was surprising was that these firms were equipped throughout with the most modern and up-to-date imported personal computers.

Consistent with the trend we observed the previous year for computer technology to be developed by nonaffiliated firms, Unitra Magmor (electroc-acoustics, hi-fi technology, information technology) displayed a computer terminal. Designed in collaboration with the technical university of Gdansk, it is suitable for use both with Odra computers and as a personal computer. The primary goal of development, according to display personnel, is to gain access to computer technology in order to be able to exploit it, if necessary in developing their own equipment. Thus the educational benefits derived from dealing with new technology were a primary consideration.

Mikrokomputery Co., GmbH is a new company that has dedicated itself to the development and production of modern personal computers. Its partners include 15 state concerns and combines that have a great interest in making this technology available quickly. Some of these concerns are producers of equipment themselves, the larget being Mera Blonie (printers), Unitra Polkolor (color picture and monitor tubes), and Era (computer technology). Mikrokomputery introduced its first machine, the Mazovia 1016. This is a

16-bit personal computer with monitor, keyboard, and printer. The firm plans to develop suitable plotters and Winchester drives. The machine is compatible with the IBM PC/XT, and also with ESER machines (ESER model CM-1914). The individual components of the computer are manufactured by the partners. Mikrokomputery is the organizer and is responsible for marketing. The software packages are also processed centrally. The 16-bit K-1810 BM 86 (≙ 8086) is used as a processor.

A new 16-bit personal computer, the KRAK 86, was introduced by Mera-KFAP. It uses the Ipix operating system, which corresponds to the Xenix/Unix system. Thus the programming language is C. Minidiskettes are used as storage media. It is also possible to use other operating systems, like the Mikros 86, CP/M, or MS-DOS, including interpreters for other languages. The working memory holds 256K and can be expanded to 768K. The disk holds 500 kilobytes-2 megabytes, depending on the stage of development. In addition, an arithmetic coprocessor can be added. The system includes the basic machine, a keyboard with alphanumeric and function keys, and a monochrome monitor. V.24 and Centronics interfaces are available for adding further peripherals.

Mera Blonie presented the D-100 M needle printer as a new version of the D-100. Its print speed is 50 cpm. It is serially equipped with a Centronics interface, and V.24 and IRPS interfaces are available as options. It prints Alphanumeric characters bidirectionally and grahics monodirectionally. Its buffer storage capacity is 8K. It is fully compatible with the FX-80 and can use ASCII KOI-7 and KOI-8 character sets. The printer uses A4 paper, fan paper, and roller paper. It measures 380 mm by 80 mm by 200 mm, and weighs 6 kg. It has an input of 50 VA.

The Mera 630 plotter was introduced by Meraster. It works in the A4 and A3 formats, and has 4 drafting elements. With a resolution of 0.1 mm, it is suitable both for graphics and for preparing technical drawings (e.g. wiring board diagrams). Interfaces are available for Centronics, IEEE 488, and V.24. Dimensions: 470 mm by 250 mm by 110 mm, weight 5.5 kg, input 35 VA. Another new development is the Mera 621 plotter, which works in A3 format and can accept up to six writing elements. Felt-tip pens, technical pens, and ball-points can be inserted in it. A paper format of 420 mm by 297 mm is exploited up to 400 mm by 287 mm. Its resolution is 0.05 mm and has a drafting speed of 300 mm/s. The plotter has a V.24 interface. It is driven by the UCY 7880 microprocessor (≙ 8080A). The buffer has a capacity of 2K. Dimensions: 530 mm by 560 mm by 157 mm, weight 13 kg, input 80 VA.

Mera Elzab introduced a new 16-bit personal computer called the ComPAN 16 (CM 1905), which operates with the UCY 7880 microprocessor system. It has a working memory of 2 megabytes, and the video RAM has a maximum capacity of 64K words, depending on the stage of development. The floppy disk controller functions with a maximum of four drives (5-inch or 8-inch), and the operating system is CP/M. Possible programming languages are Assembler, BASIC, Forth, Fortran, and Pascal.

The Meritum microcomputers were originally intended for use in education and as home computers, but they are now used exclusively for professional purposes. The Meritum III corresponds essentially to the Meritum II presented last year, but expanded so that it can be used to build up small local networks (Merinet). In this mode it functions as a switchboard.

The Elwro 800 Junior microcomputer from Elwro is designed exclusively for schools, popular education, and training. It uses the CP/M operating system and its basic programming language is PROM resident. Other languages can be loaded if they are CP/M compatible. The processor is the 4-MHz variant of the U-880. The machine has a 64K RAM and 24K EPROM. In addition to a Centronics interface, there is a universal one for adding on measuring devices. Further, black-and-white or color televisions, cassette recorders, and disk drive can be connected to it. A special interface for local networks is also available.

Lumel introduced a power and energy reference source known as the SQ-33. With the help of a microcomputer, it can produce monophase and three-phase alternators and current input, and phase angles and power factors for the calibration of power meters and other electrical measuring devices. Some technical data: voltage range 250-750 V, current range 1-50 A, tuning error ± 0.05 percent, range error ± 0.01 percent, frequency range 40-4,999 Hz, power range 3 x 37, 500 VA cos ϕ. Dimensions: 470 mm by 310 mm by 545 mm, weight 45 kg.

In the area of consumer electronic goods, there were many interesting and attractive new developments. Unfortunately, these often lacked technical data. There was a striking wealth of variations on certain basic components for hi-fi systems, which complement components made by other manufacturers, so that almost all producers of hi-fi technology were able to offer complete systems. Certain areas of specialization (e.g. Unitra ZRK for cassette technology, Unitra Eltra for tuners, Unitra Fonica for phonograph and amplifier technology) not only guard against duplication of development and fragmentation of developmental capacity, but also ensure creative variation. An example is a component system that consists of the PW-8010 and amplifier (Fonica), the T-8015 tuner (Eltra), and the M-8017 cassette deck (ZRK).

Unita Eltra introduced a digitally tuned stereo tuner, the T-9050, which works on the principle of frequency synthesis. In addition to the OIRT FM band, it receives in the AM short-wave, medium-wave, and long-wave ranges.

In cooperation with the Japanese firm of Sankei, Eltra developed a dual cassette stereo radio recorder known as the TCR-S33. One version has playback capability only, while a second has both record and playback functions. Another dual cassette machine with stereo radio was introduced by Unitra ZRK, unfortunately without further technical data.

The M-9201 cassette deck also comes equipped with two cassette mechanisms. It has responsive ("soft touch") keys and LED recording level indicators, as well as a Dolby B system. Tapes can be Fe_2O_3, CrO_2, or metal. When using iron

oxide and chromium dioxide tapes, it has a frequency range of 30-15,000 Hz, while with a metal tape it is 30-17,000 Hz. It has a distortion factor of 0.22 percent (Fe_2O_3), 1.5 percent (CrO_2), or 0.5 percent (metal). Dimensions: 440 mm by 117 mm by 230 mm, weight 8 kg.

A portable stereo cassette player, the PS-105, was produced in cooperation with the Uher company. It belongs to the so-called "Walkman class," and has playback, fast forward, and stop functions only. The stereo headphones are said to have an impedance of 8-50 Ω, and initial output of 2 x 18 mW, a frequency range of 125-8,000 Hz, a crosstalk attenuation of 30 dB, a distortion factor of 3 perent, and dynamics of 40 dB, U_{CC} = 3 V. Dimensions: 111 mm by 81 mm by 29.5 mm.

The ZM-9050 hi-fi system was interesting. It has an infrared remote control. The P-9050 infrared control component with preamplifier was developed by Unitra Fonica, the M-9050 cassette deck comes from ZRK, and the T-9050 OIRT CCIR digital tuner is manufactured by Tesla, CSSR, and uses a one-chip 8048 microcomputer. The data for the cassette deck correspond to the M-9201 type. The A-9050 power amplifier (Fonica) has an initial output of 2 x 35 W with k $\leq$ 0.15 percent. The initial impedance is 8 Ω, with a frequency range of 30-30,000 Hz.

ZRK produced the VR-6462 VHS video recorder in collaboration with a Japanese company. It is suitable for PAL and SECAM television. It operates on channels E2 to S3 (VHF I), M1 to U9 (VHF III), and 21 to 69 (UHF). Its initial voltage is 1 V (SS) +6/-3 dB at 75 Ω; output voltage is 1 V (SS) + 1.5 dB at 75 Ω. Dimensions: 420 mm by 330 mm by 105 mm, weight 7 kg, input 28 VA (typical) or 10 VA (in preparation).

Unitra Diora introduced the "Semi-Slim" hi-fi system, consisting of an AS-631 (AM-FM tuner), WS-430 (amplifier), FS-030 (equalizer), and MDS-430 (cassette deck). The frequency display for tuning is digital; for all other displays LED's are used. It operates in a CCIR range of 87.5-108 mHz and has an NF frequency range of 30-15,000 Hz (-2 dB). Channel crosstalk attenuation is 45 dB at 1 kHz, distortion factor 0.2 percent (mono) and 0.35 percent (stereo). Sensitivity 0.9 μV, S/N = 62 dB, weight 4.8 kg. The WS-430 amplifier has both a phonograph plug and one for a compact disc player, and has a special plug for the FS-030 equalizer. Some technical data: output 2 x 42 W (sine) and 2 x 60 W (music); k $\leq$ 0.05 percent; frequency range 20-20,000 Hz; crosstalk attenuation 65 dB at 1 kHz and 45 dB at 10 kHz; weight 7 kg; input 160 VA. The FS-030 equalizer has two sets of five channels (60; 250; 1,000; 3,500; 10,000 kHz) that are adjusted with sliding controls. It has a tuning range of $\pm$10 dB, S/N 75 dB, frequency range 15-30,000 Hz, and a distortion factor of 0.04 percent. The cassette deck is front-loading. The mechanism is extruded by a motor for insertion of the cassette, and may be played in the extended or retracted state. It operates with three motors and has a Dolby B system. The following tape types can be used: Fe_2O_3 (30-15,000 Hz, k $\leq$ 0.8 percent), CrO_2, (30-16,000 Hz, k $\leq$ 2.5 percent), and metal (30-17,000 Hz, k $\leq$ 2.5 percent). S/N is 51 dB without Dolby or 65 dB with Dolby. It has a crosstalk attenuation of 51 dB, wow and flutter 0.15 percent, weight 7 kg. All machines have dimensions of 440 mm by 90 mm by 260 mm.

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